

FIG. 1

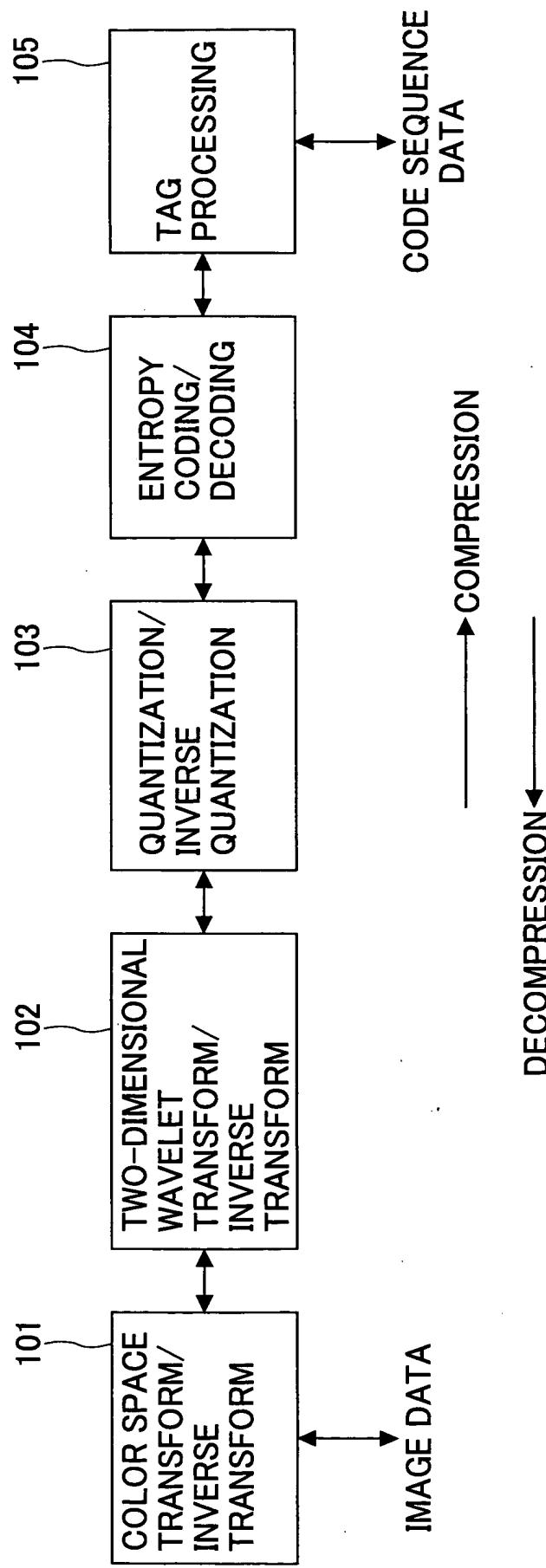


FIG.2

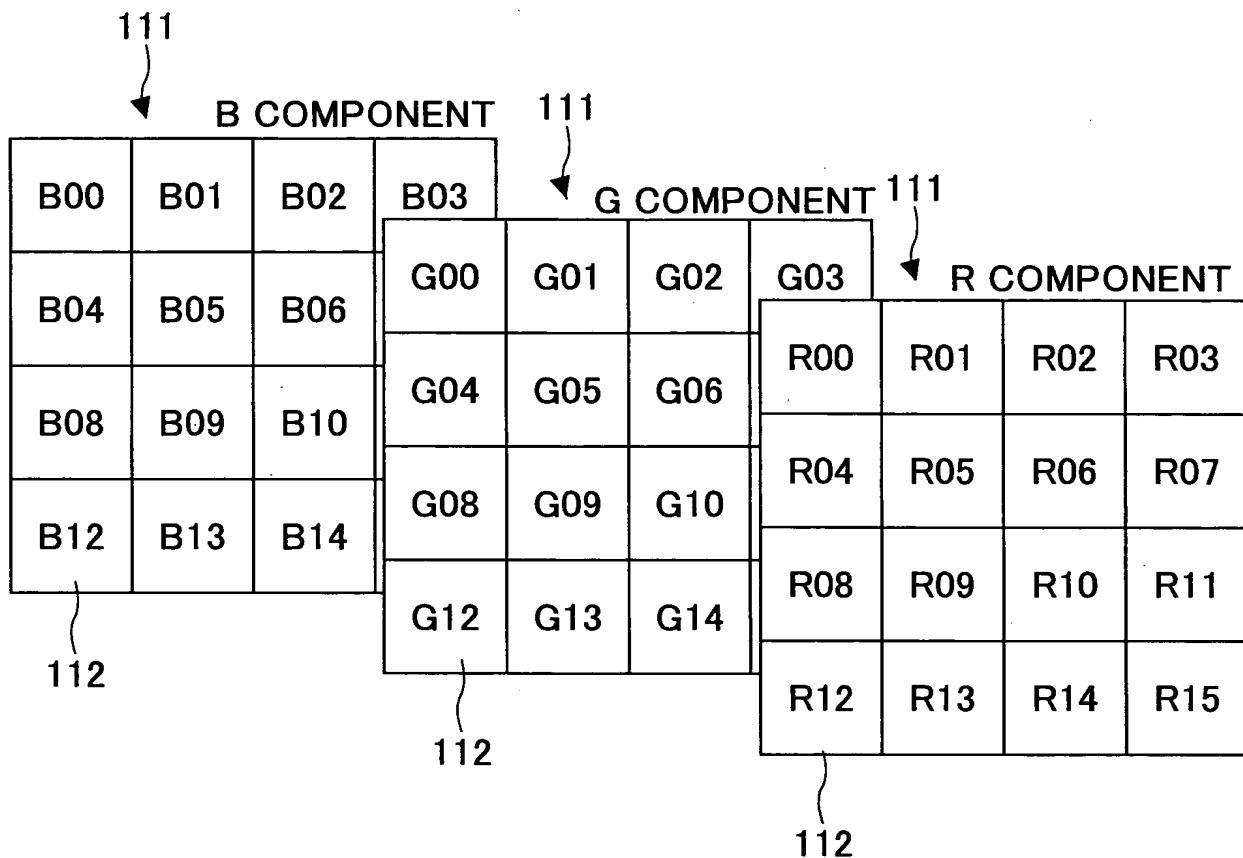
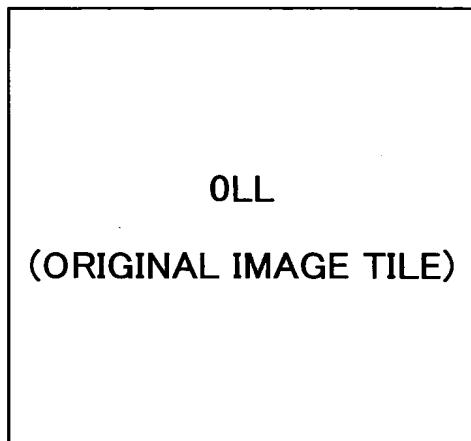
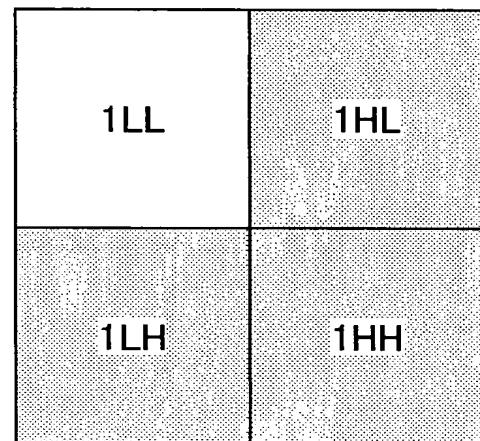


FIG.3A



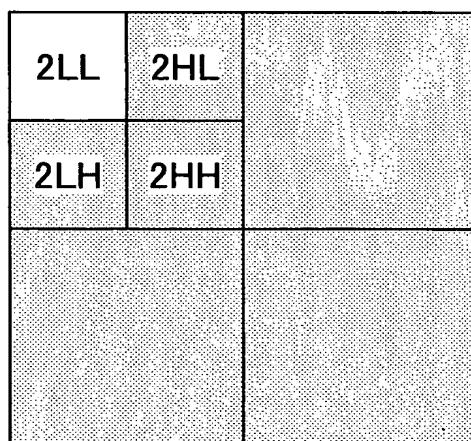
DECOMPOSITION\_LEVEL\_0

FIG.3B



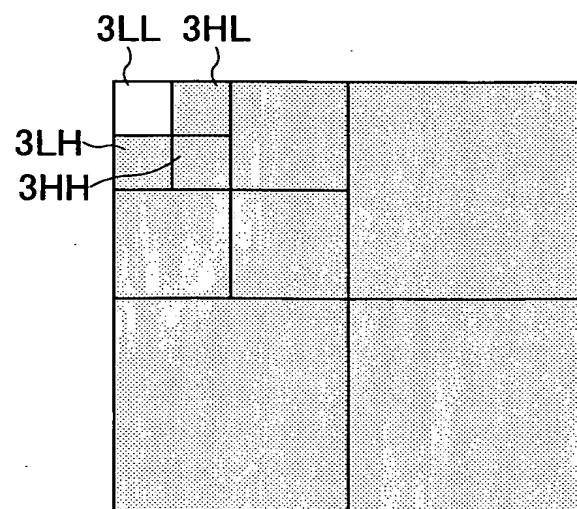
DECOMPOSITION\_LEVEL\_1

FIG.3C



DECOMPOSITION\_LEVEL\_2

FIG.3D



DECOMPOSITION\_LEVEL\_3

FIG.4

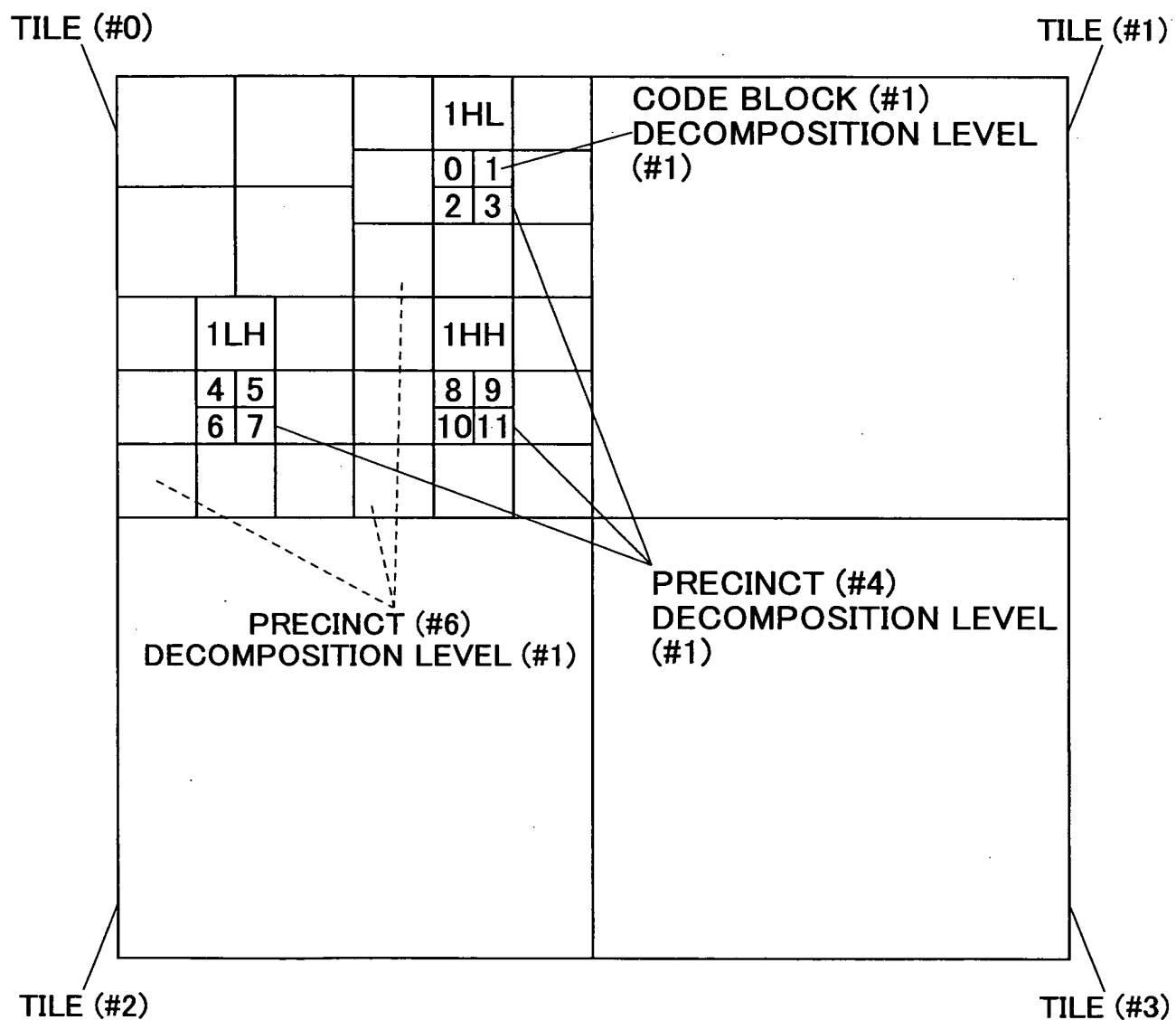


FIG.5A

DECOMPOSITION LEVEL 1

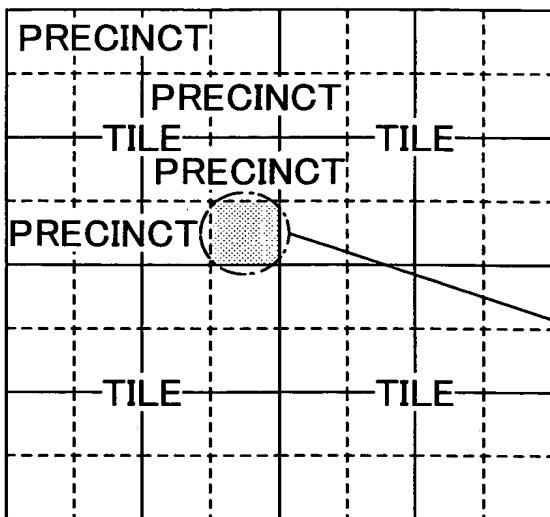


FIG.5B

-85	-80	-80	-70
-86	-82	-80	-76
-83	-83	-78	-75
-84	-85	-85	-78

FIG.5C

-84	-77	1	8
LL		HL	
-84	-79	11	4
1	1	2	-2
LH		HH	
0	-5	2	4

FIG.5D

	-84	-84	-77	-79
LAYER # = 0	-	-	-	-
LAYER # = 1	1	1	1	1
	0	0	0	0
LAYER # = 2	1	1	0	0
	0	0	1	1
LAYER # = 3	1	1	1	1
	0	0	0	1
	0	0	1	1
	1LL			

FIG.5E

1	-1	8	4
+	-	+	+
0	0	0	0
0	0	0	0
0	0	0	0
0	0	1	0
0	0	0	1
0	0	0	0
1	1	0	0
	1HL		

COEFFICIENT VALUE

COEFFICIENT SIGN (MSB)

COEFFICIENT ABSOLUTE VALUE (LSB)

FIG.5F

-1	0	-1	-5
-	0	-	-
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	1
0	0	0	0
1	0	1	1
	1LH		

FIG.5G

2	2	-2	4
+	+	-	+
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	1
1	1	1	0
0	0	0	0
	1HH		

FIG.6

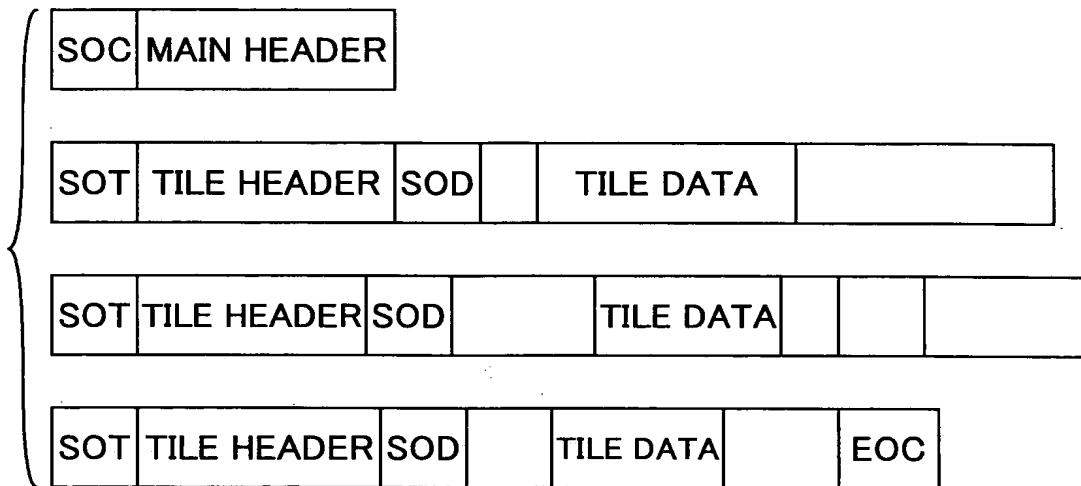


FIG.7

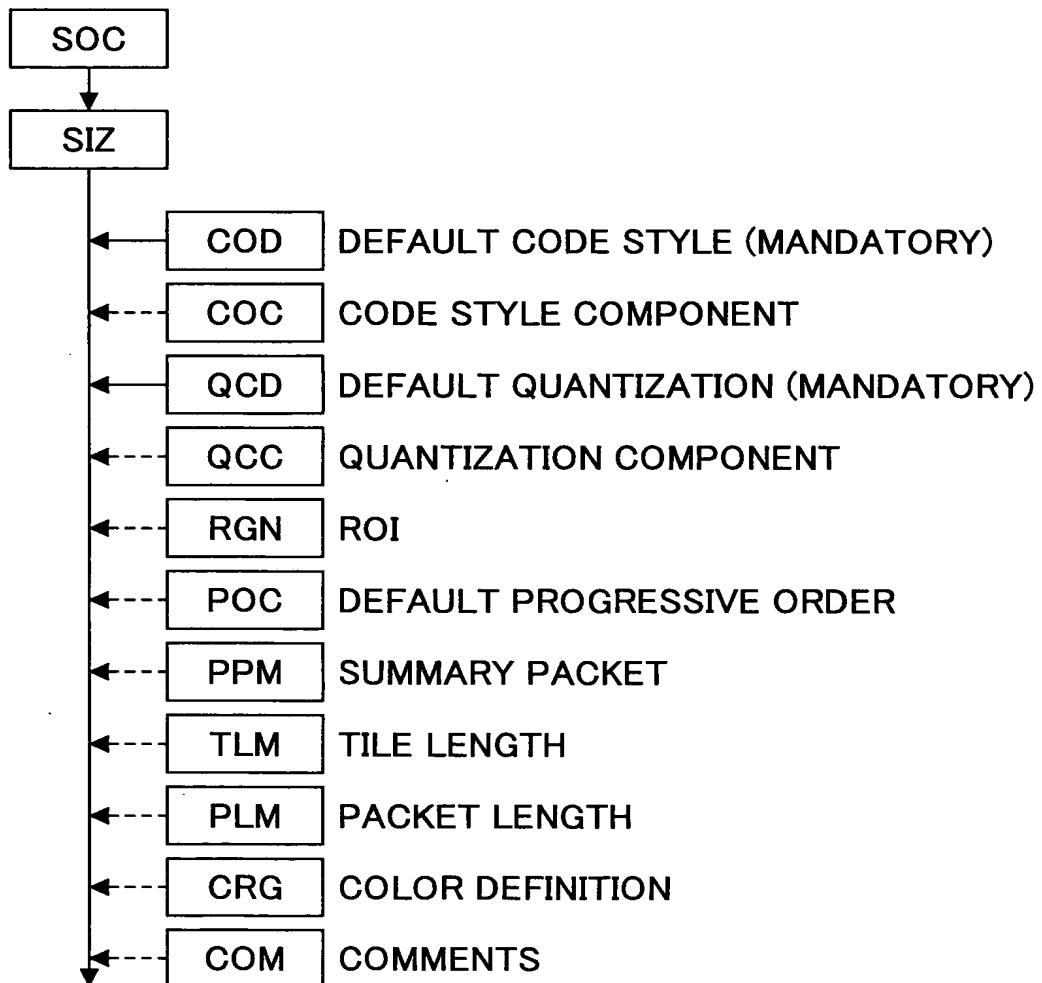


FIG.8A

FIG.8B

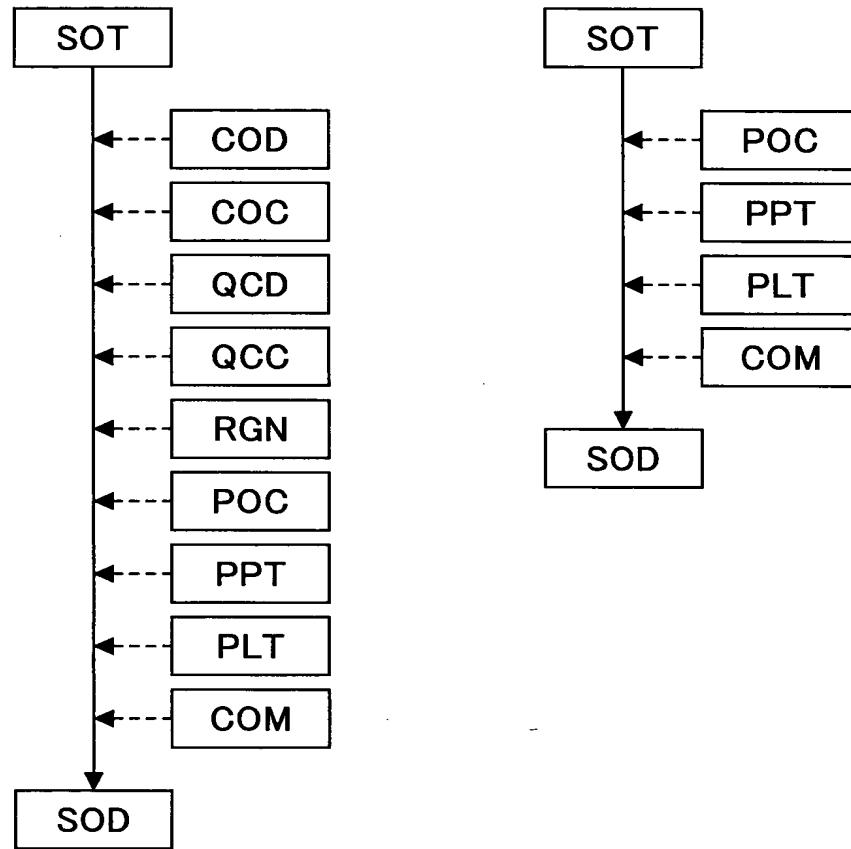


FIG.9

SOT	Lsot	Isot	Psot	TPsot	TNsot
-----	------	------	------	-------	-------

FIG.10

PARAMETER	SIZE (BITS)	VALUES
EOC	16	0xffff9

FIG.11

TLM	L <sub>tlm</sub>	Z <sub>tlm</sub>	S <sub>tlm</sub>	T <sub>tlm</sub> (i)	P <sub>tlm</sub> (i)	...	T <sub>tlm</sub> (n)	P <sub>tlm</sub> (n)
-----	------------------	------------------	------------------	-------------------------	-------------------------	-----	-------------------------	-------------------------

FIG.12

P <sub>LM</sub>	L <sub>plm</sub>	Z <sub>plm</sub>	N <sub>plm</sub> (i)	I <sub>plm</sub> (ij)	...	I <sub>plm</sub> (im)	N <sub>plm</sub> (n)	I <sub>plm</sub> (nj)	I <sub>plm</sub> (nm)
-----------------	------------------	------------------	-------------------------	--------------------------	-----	--------------------------	-------------------------	--------------------------	--------------------------

FIG.13

PLT	$L_{plt}$	$Z_{plt}$	$I_{plt}^{(i)}$	$\dots$	$I_{plt}^{(n)}$
-----	-----------	-----------	-----------------	---------	-----------------

PPM	$L_{ppm}$	$Z_{ppm}$	$N_{ppm}^{(i)}$	$N_{ppm}^{(i)}$	$\dots$	$I_{ppm}^{(i)}$	$\dots$	$I_{ppm}^{(i)}$
-----	-----------	-----------	-----------------	-----------------	---------	-----------------	---------	-----------------

{

FIG.14

$N_{ppm}^{(n)}$	$I_{ppm}^{(n)}$	$\dots$	$I_{ppm}^{(n)}$
-----------------	-----------------	---------	-----------------

FIG.15

PPT	$L_{ppt}$	$Z_{ppt}$	$I_{ppt}(i)$	...	$I_{ppt}(n)$
-----	-----------	-----------	--------------	-----	--------------

FIG.16

COM	$L_{com}$	$R_{com}$	$C_{com}(i)$	...	$C_{com}(n)$
-----	-----------	-----------	--------------	-----	--------------

FIG.17

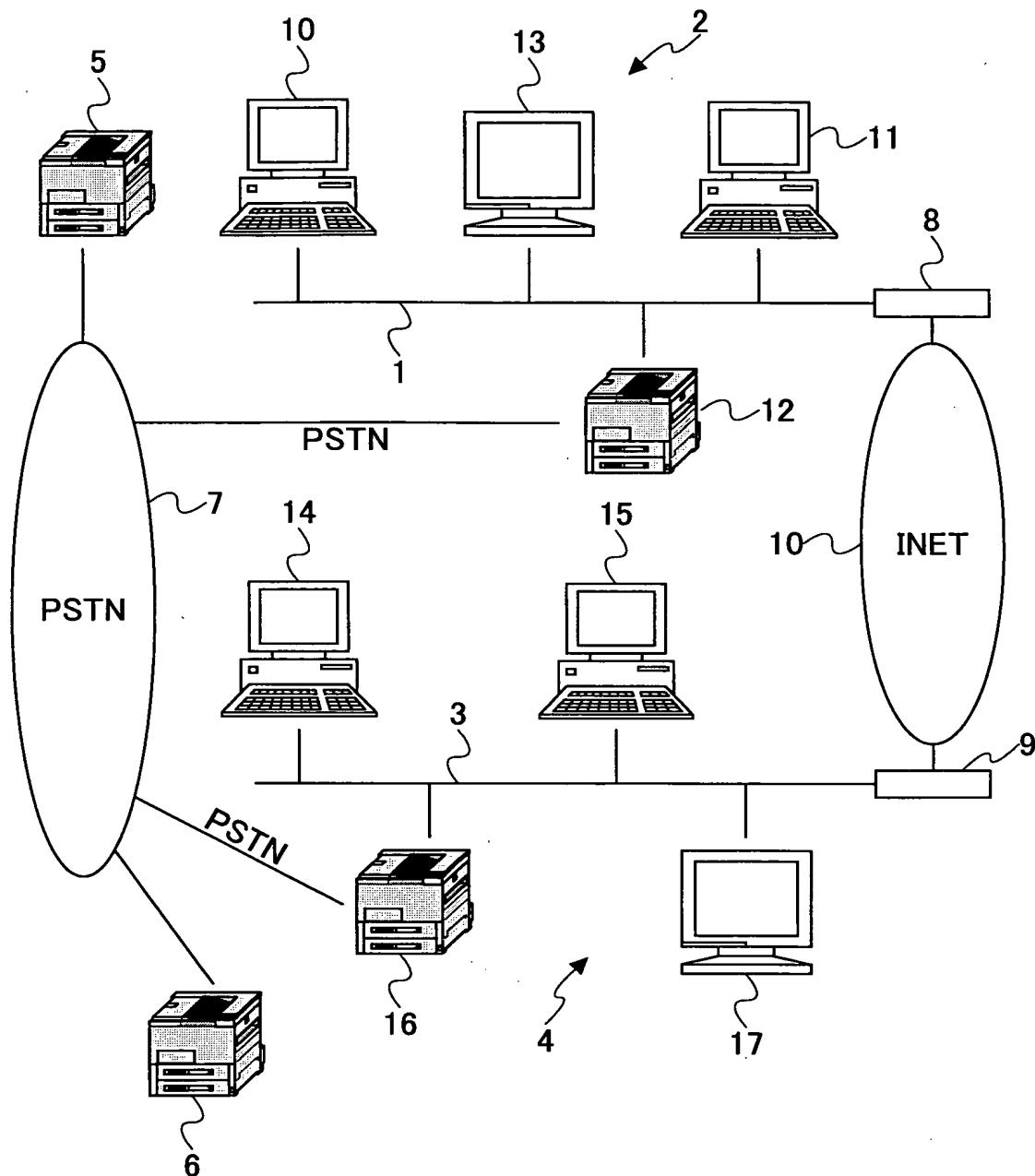


FIG.18

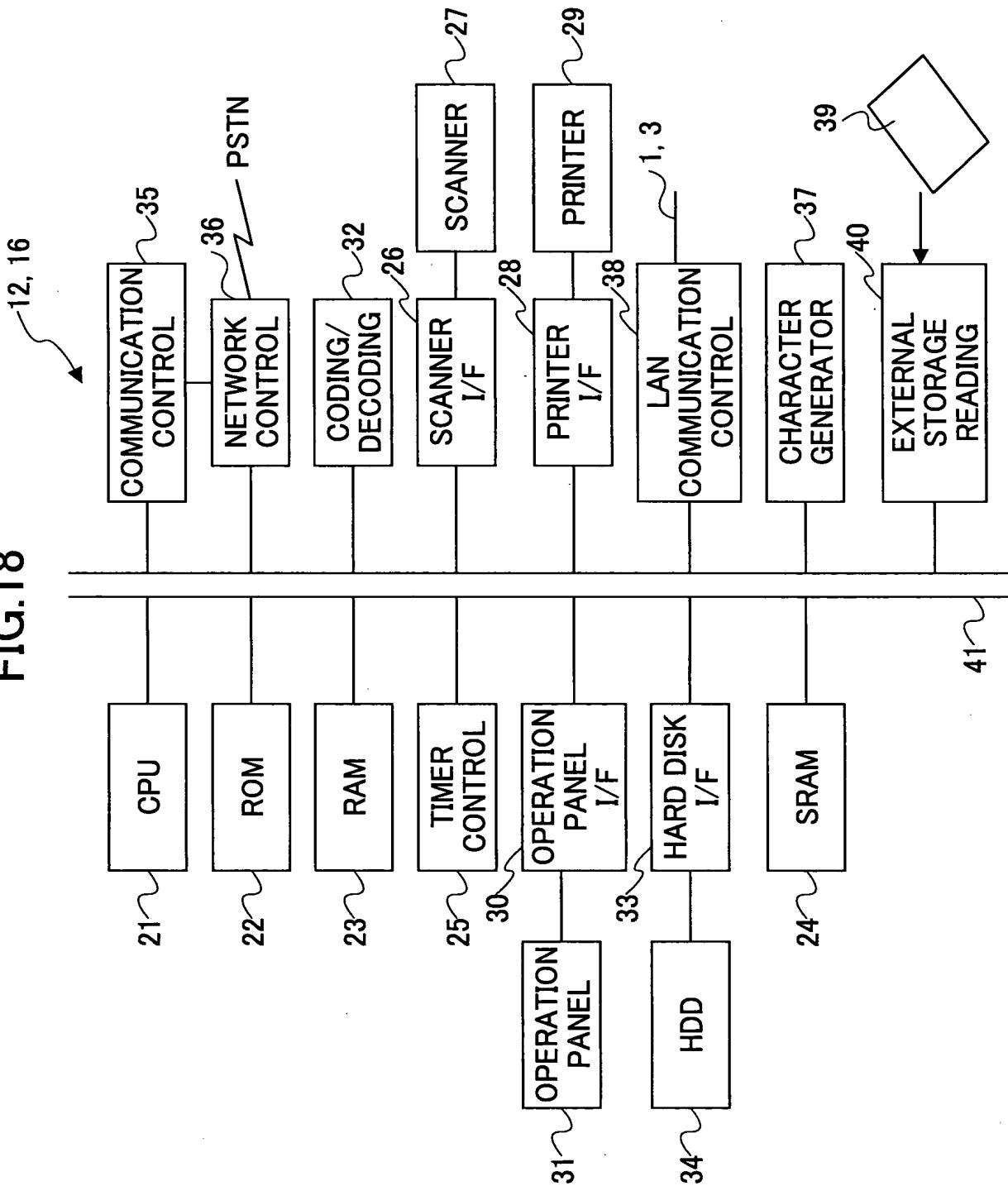
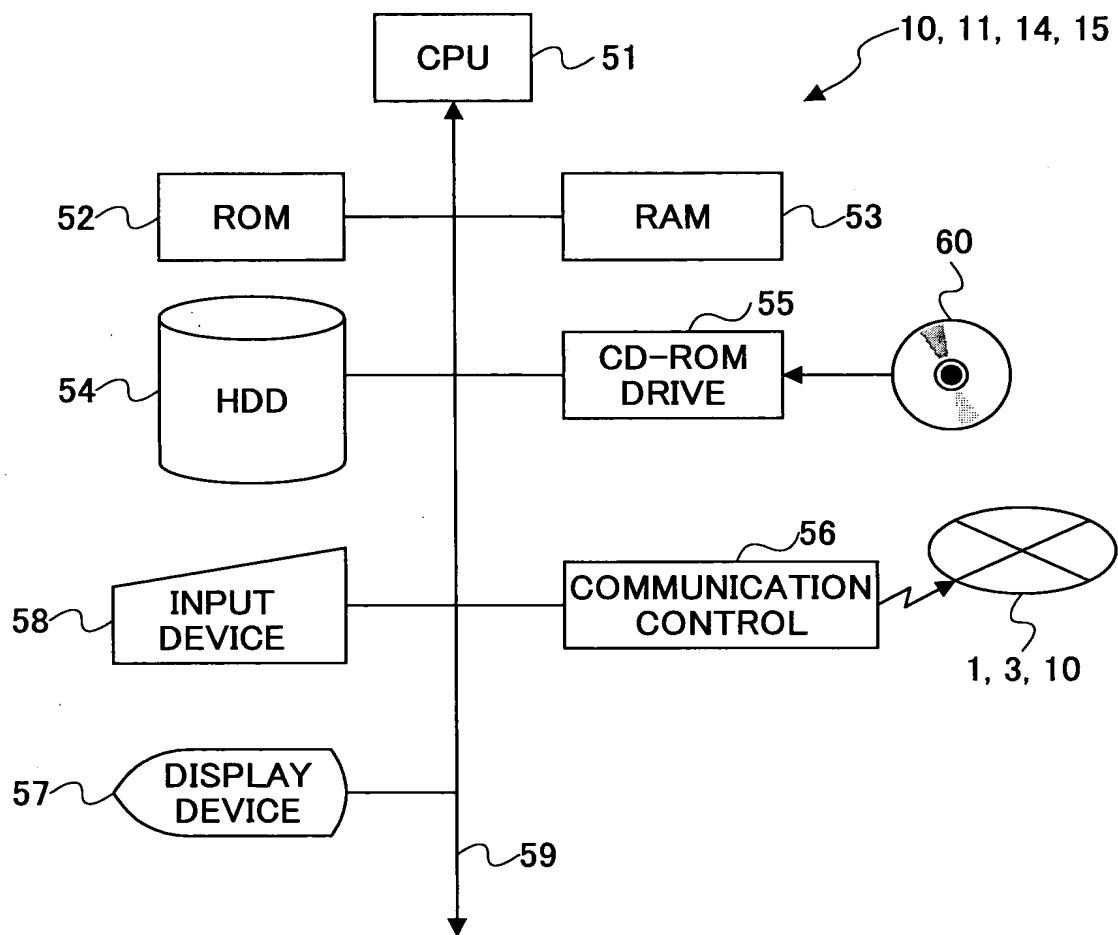
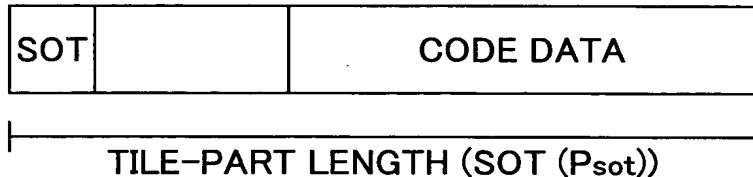


FIG.19



## FIG.20A

### TILE-PART HEADER



## FIG.20B

### TILE-PART HEADER

EMBEDDING  
INFORMATION  
(ADDITIONAL  
INFORMATION)

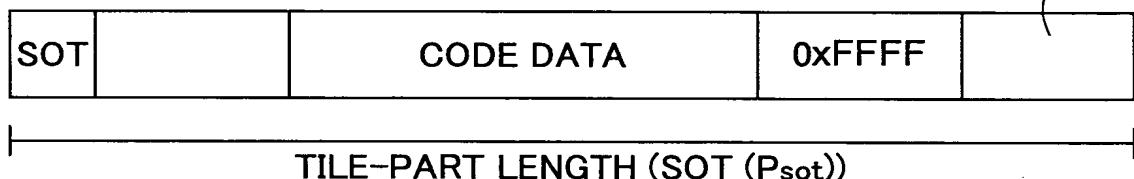


FIG.21

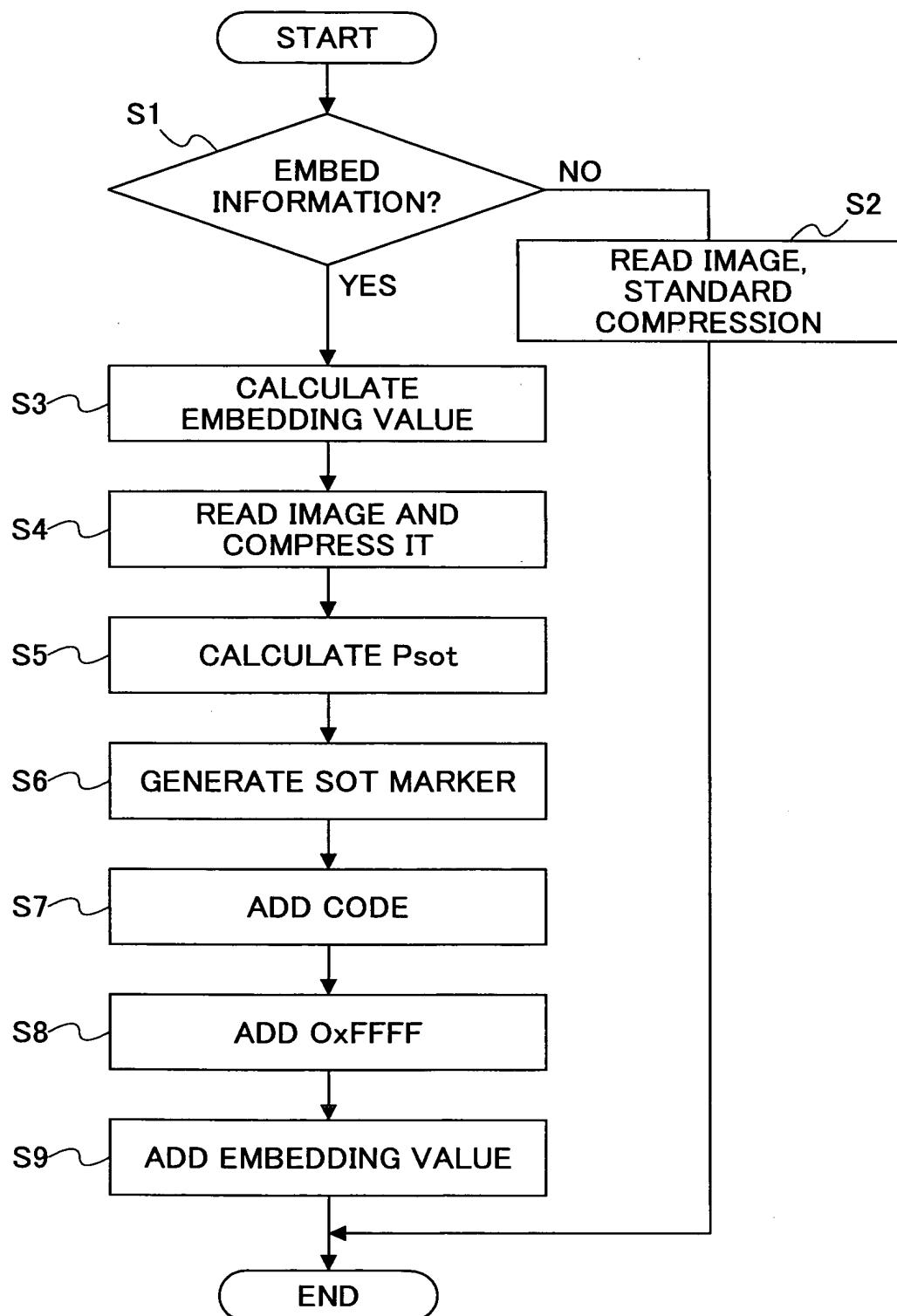
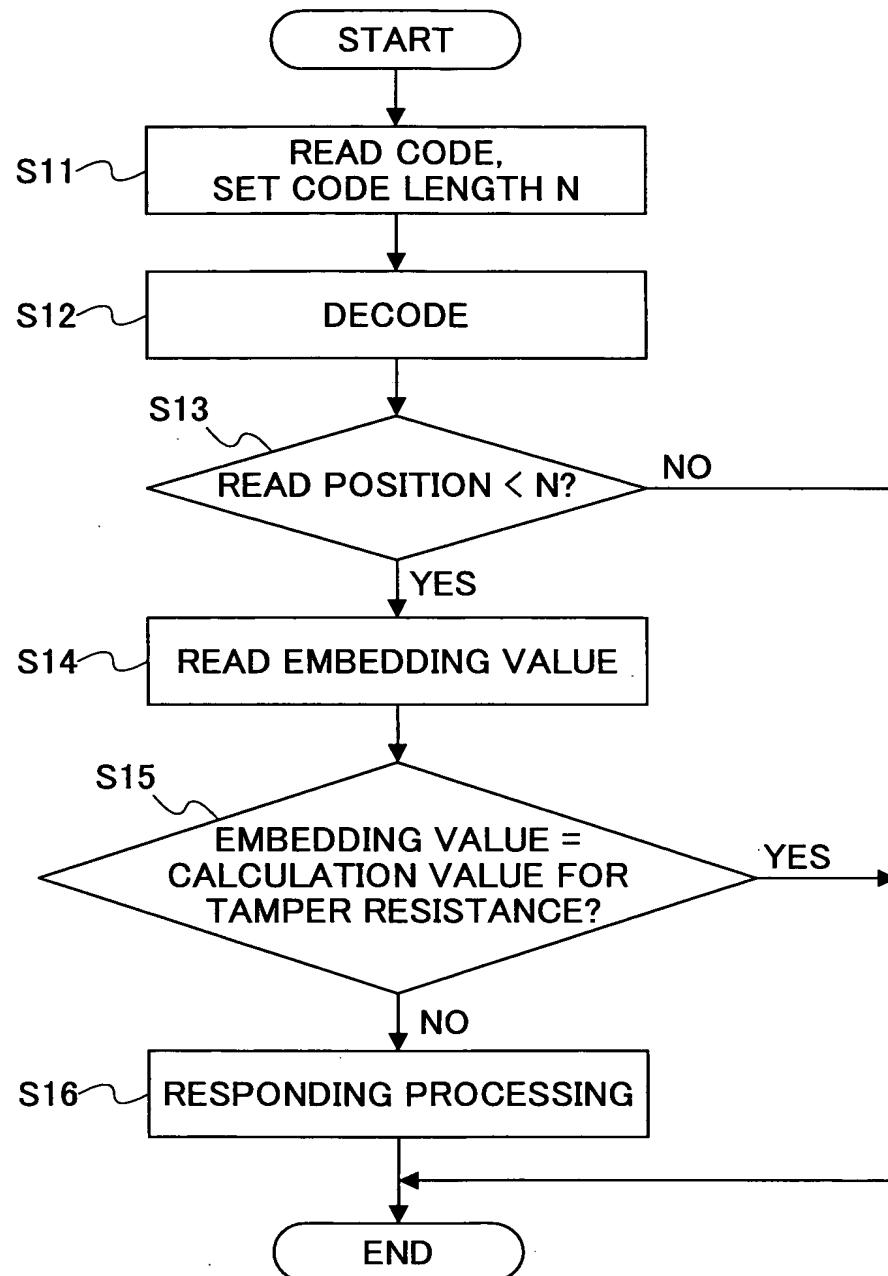
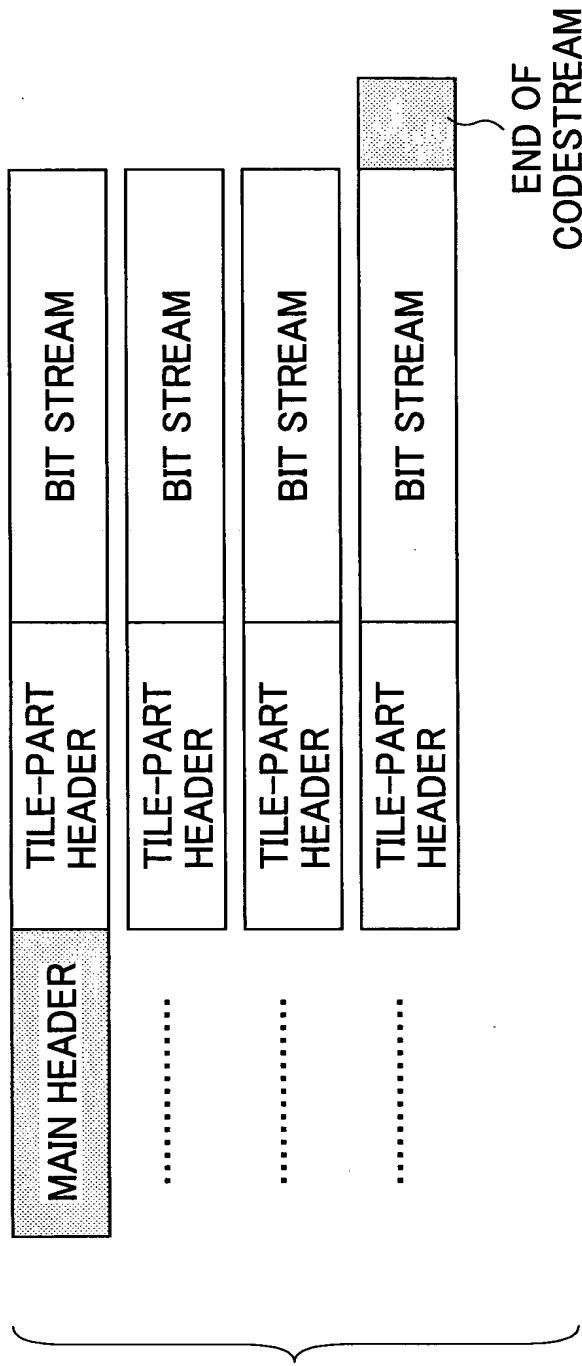
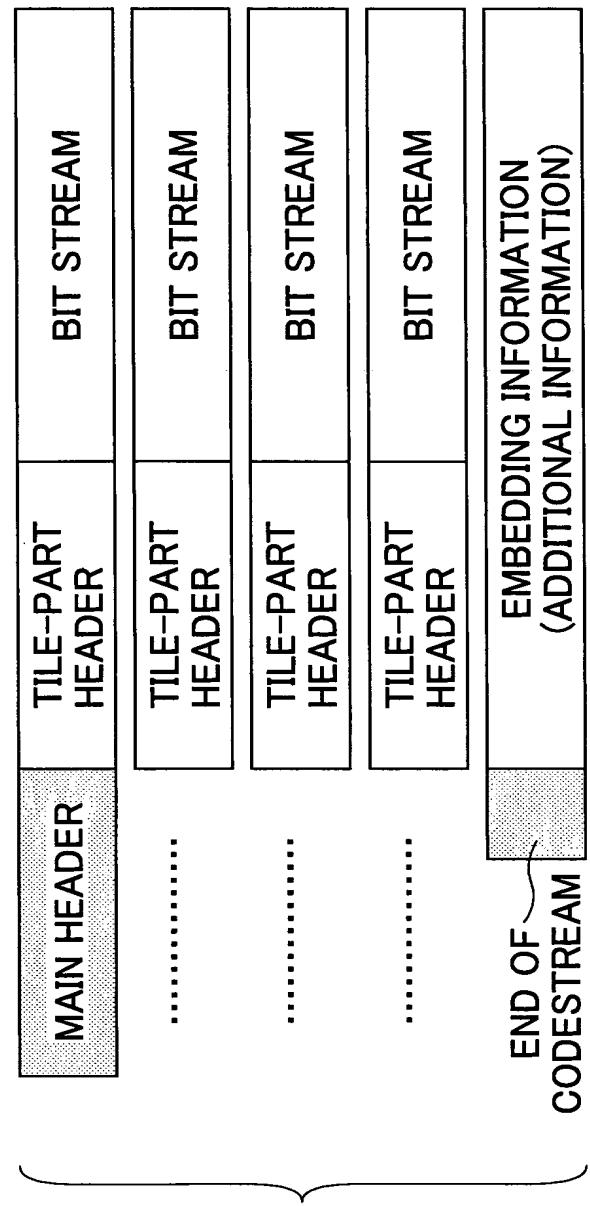


FIG.22





**FIG.23A**



**FIG.23B**

FIG.24

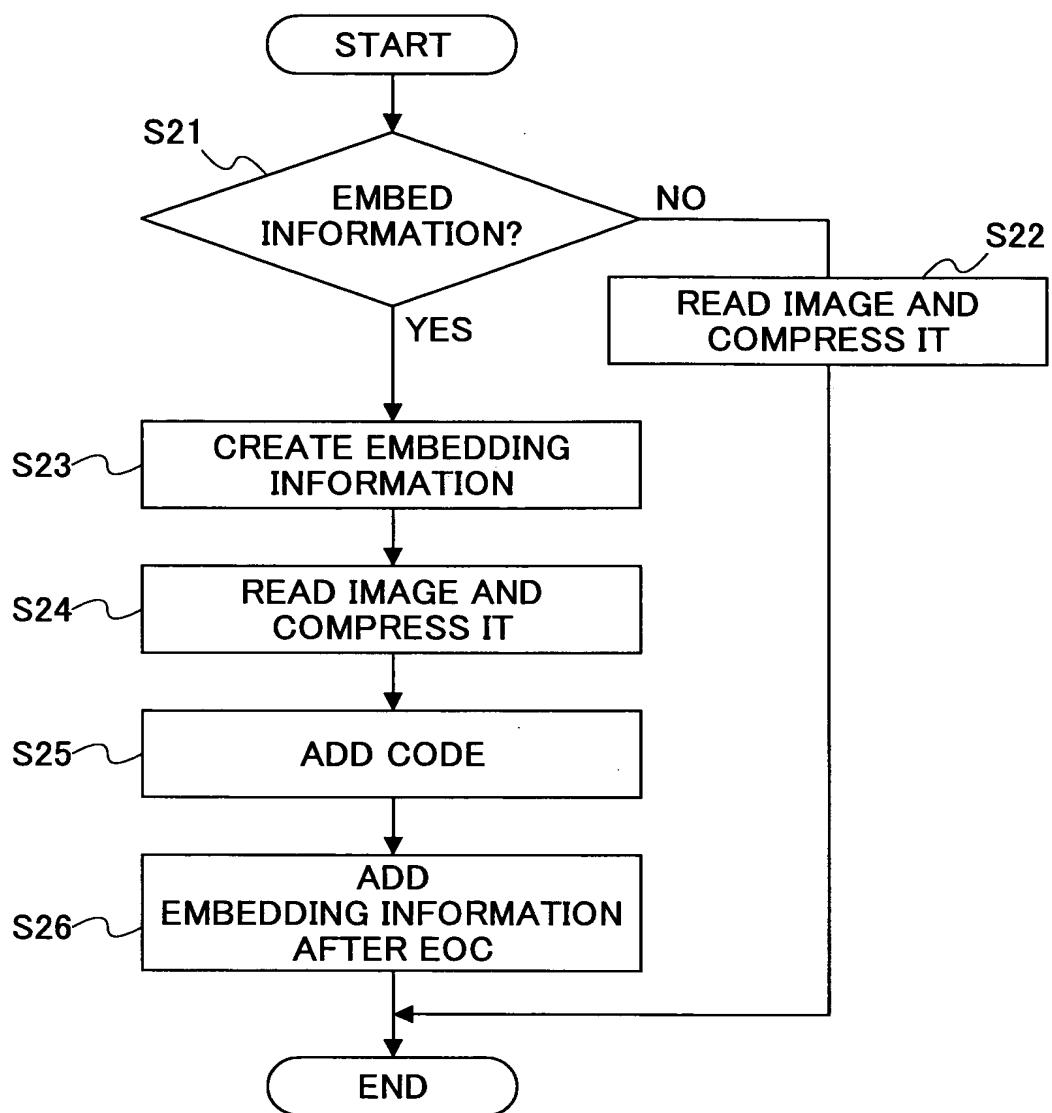


FIG.25

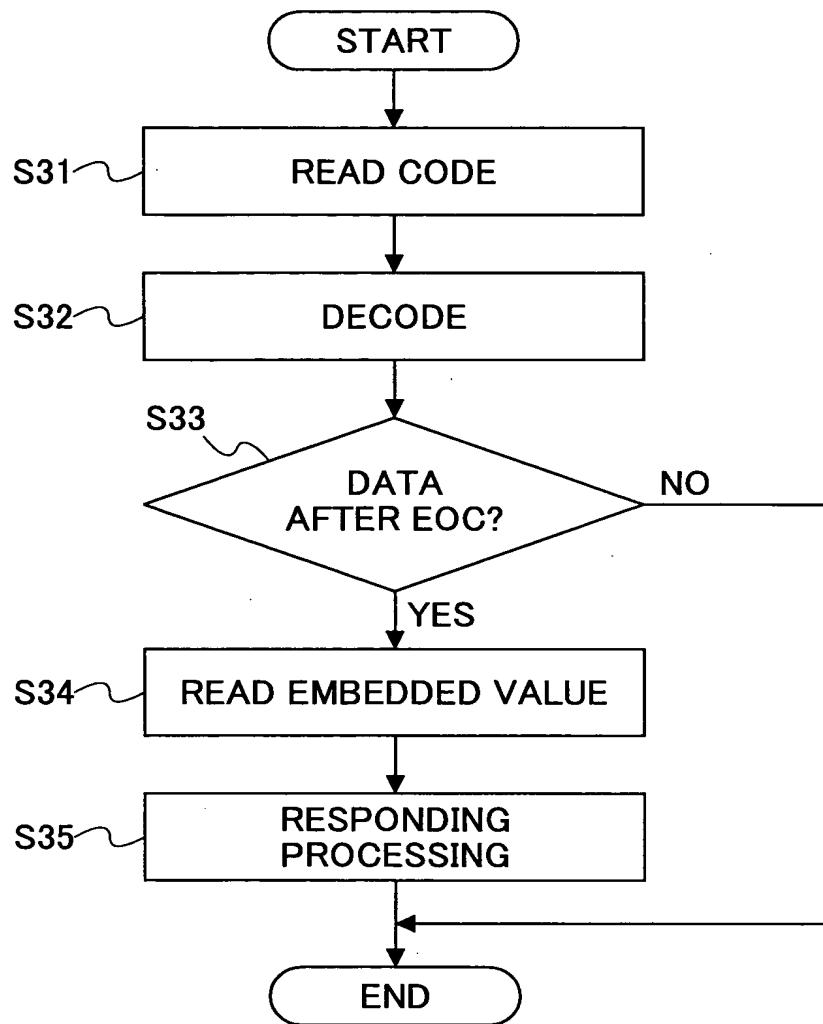


FIG.26

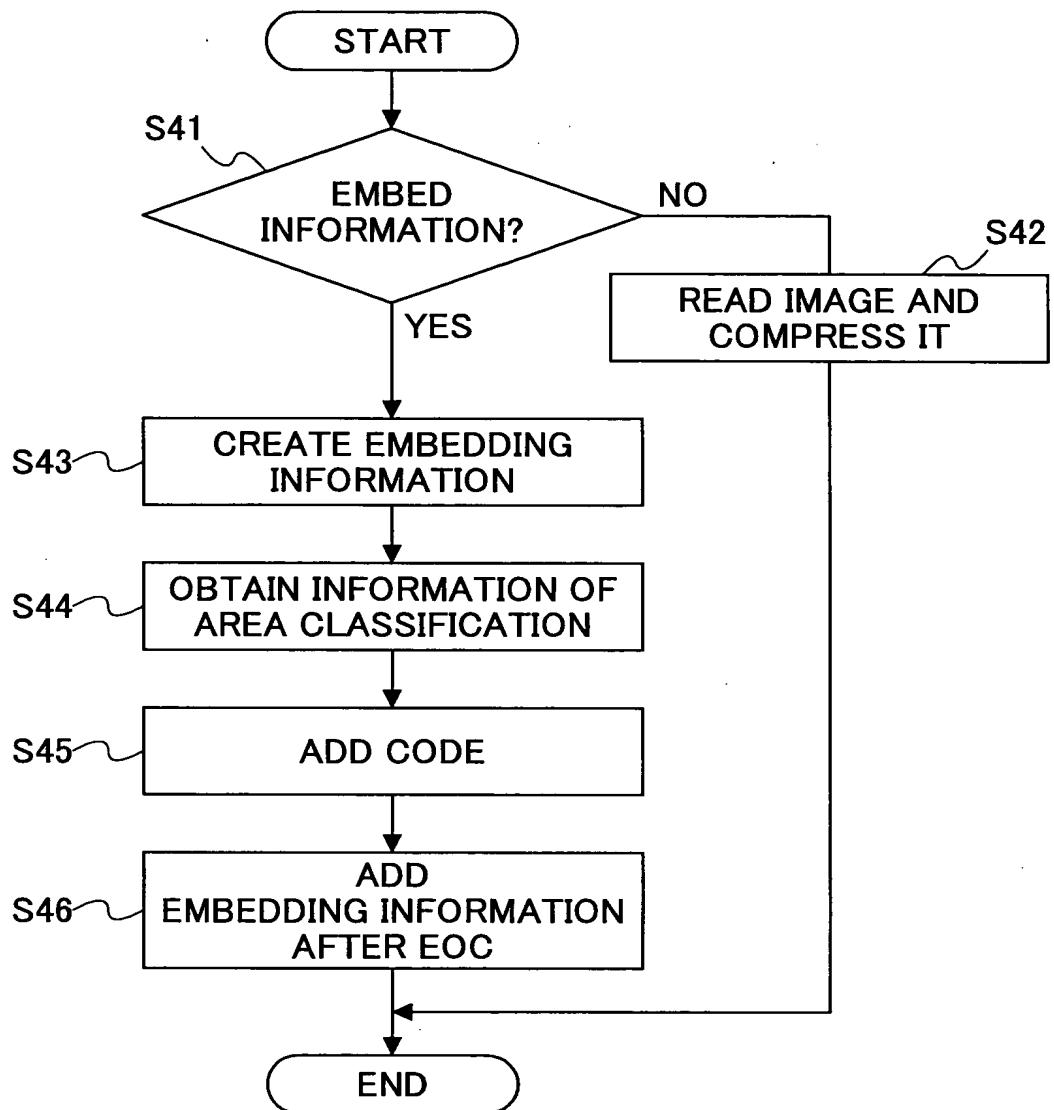


FIG.27

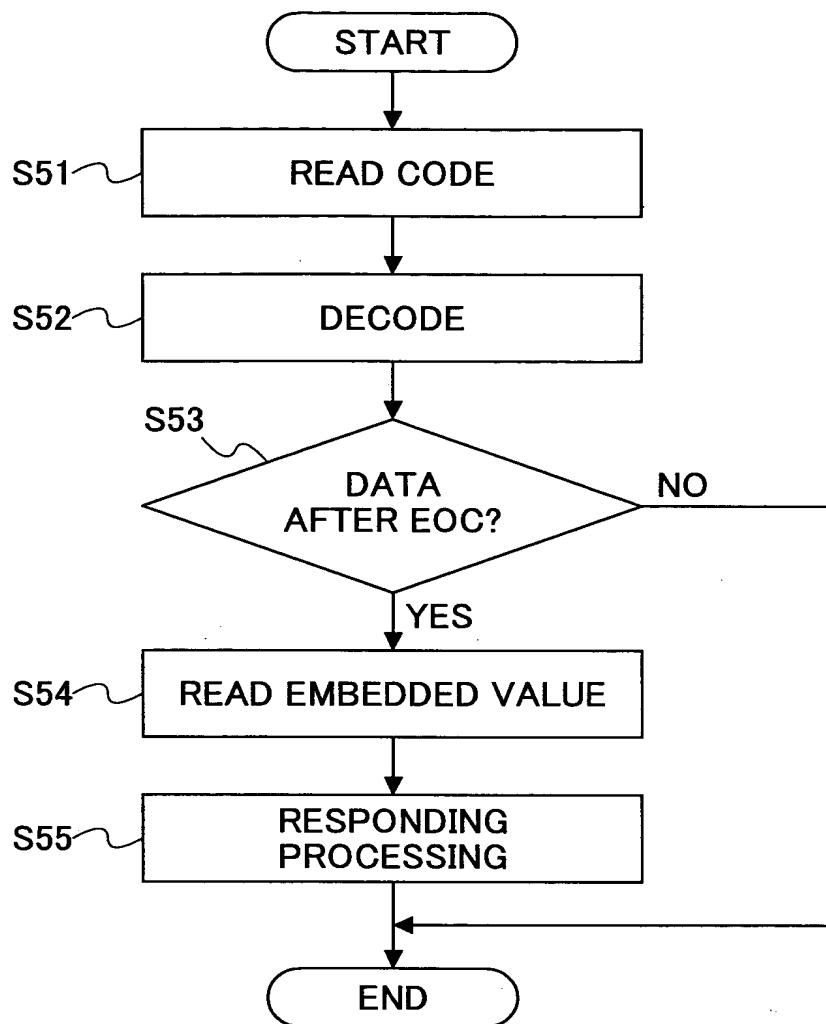


FIG.28

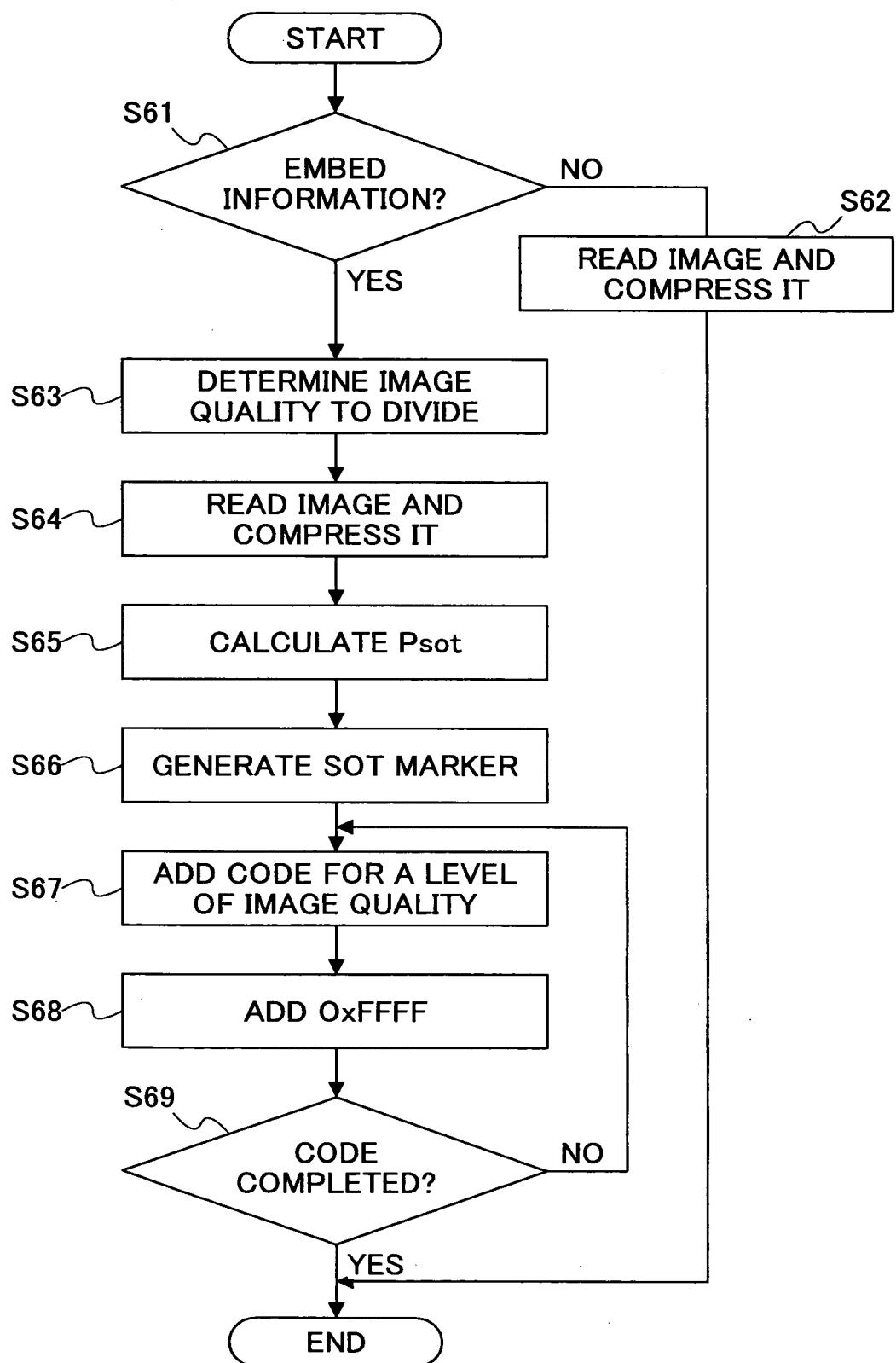


FIG.29

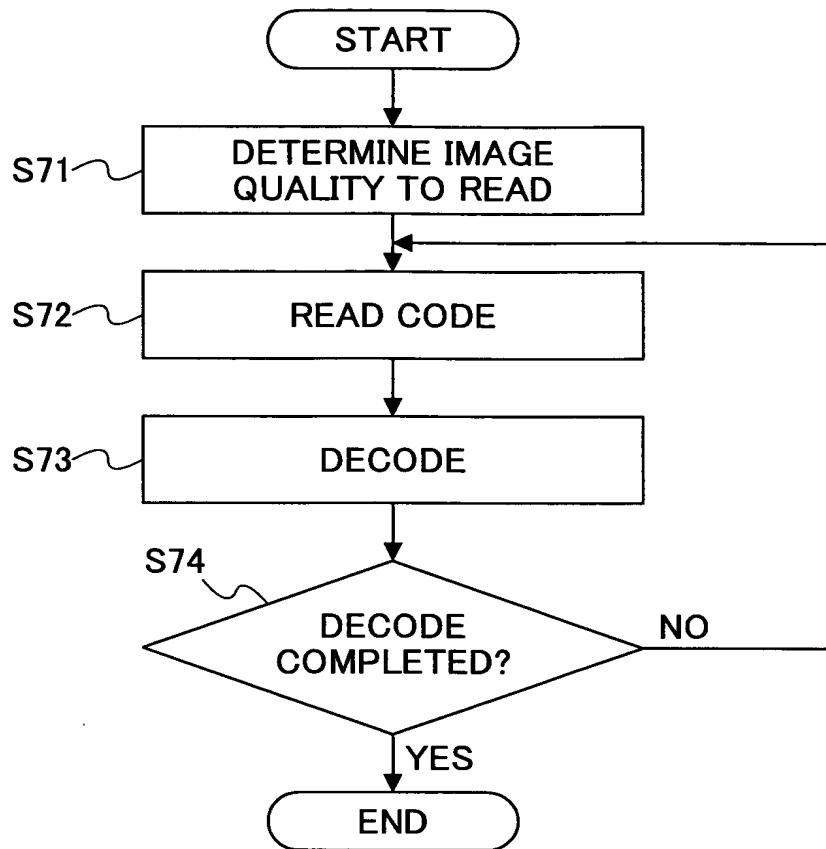


FIG.30

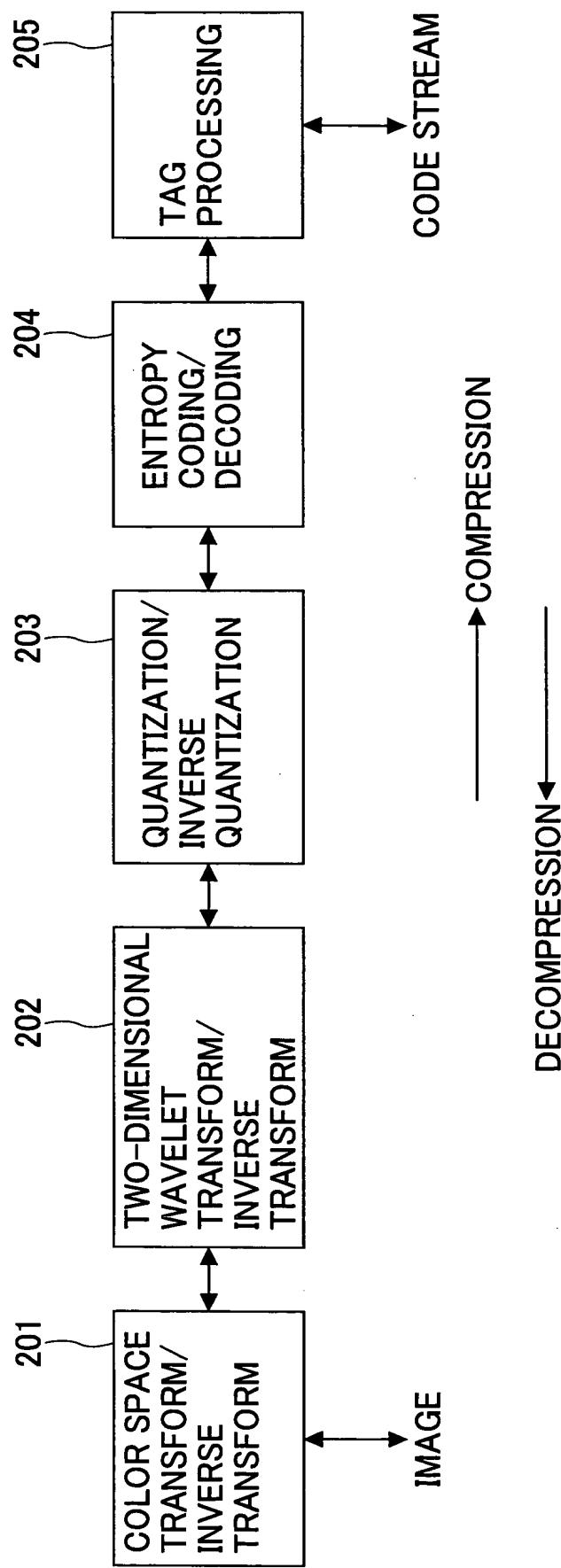
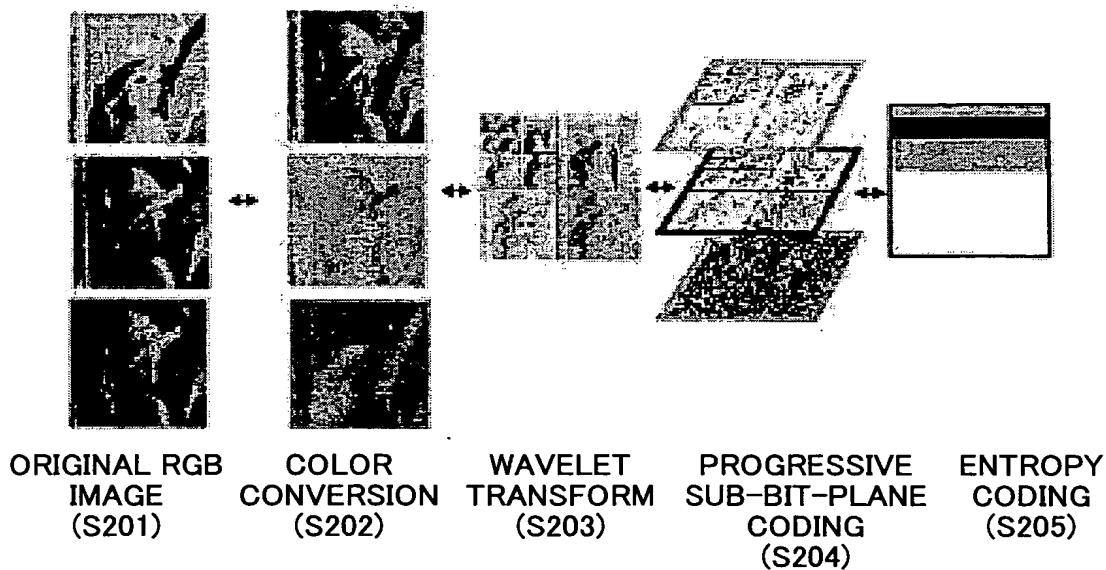
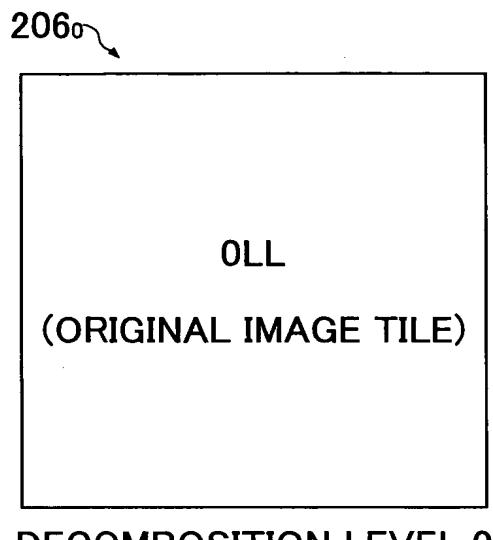


FIG.31

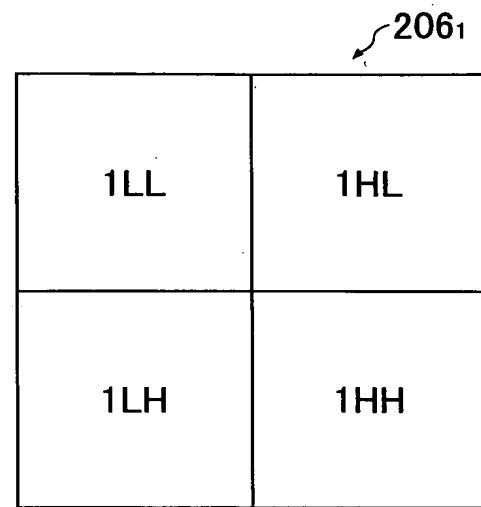


**FIG.32A**



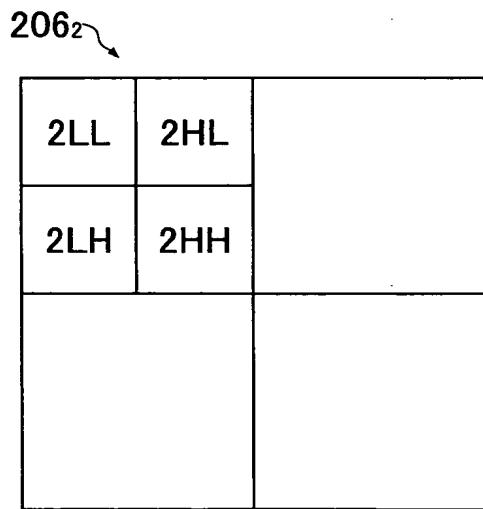
DECOMPOSITION\_LEVEL\_0

**FIG.32B**



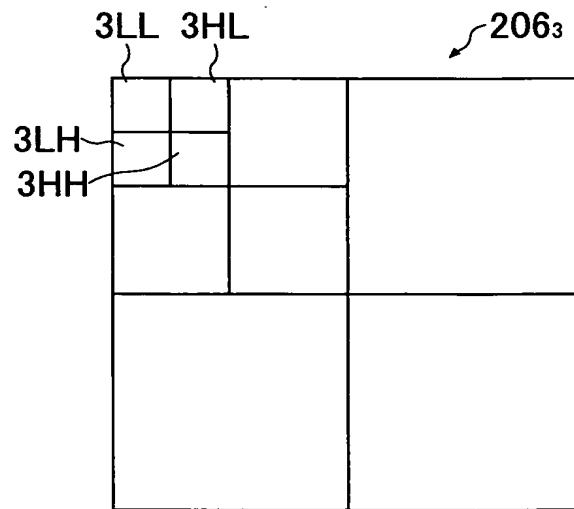
DECOMPOSITION\_LEVEL\_1

**FIG.32C**



DECOMPOSITION\_LEVEL\_2

**FIG.32D**



DECOMPOSITION\_LEVEL\_3

FIG.33

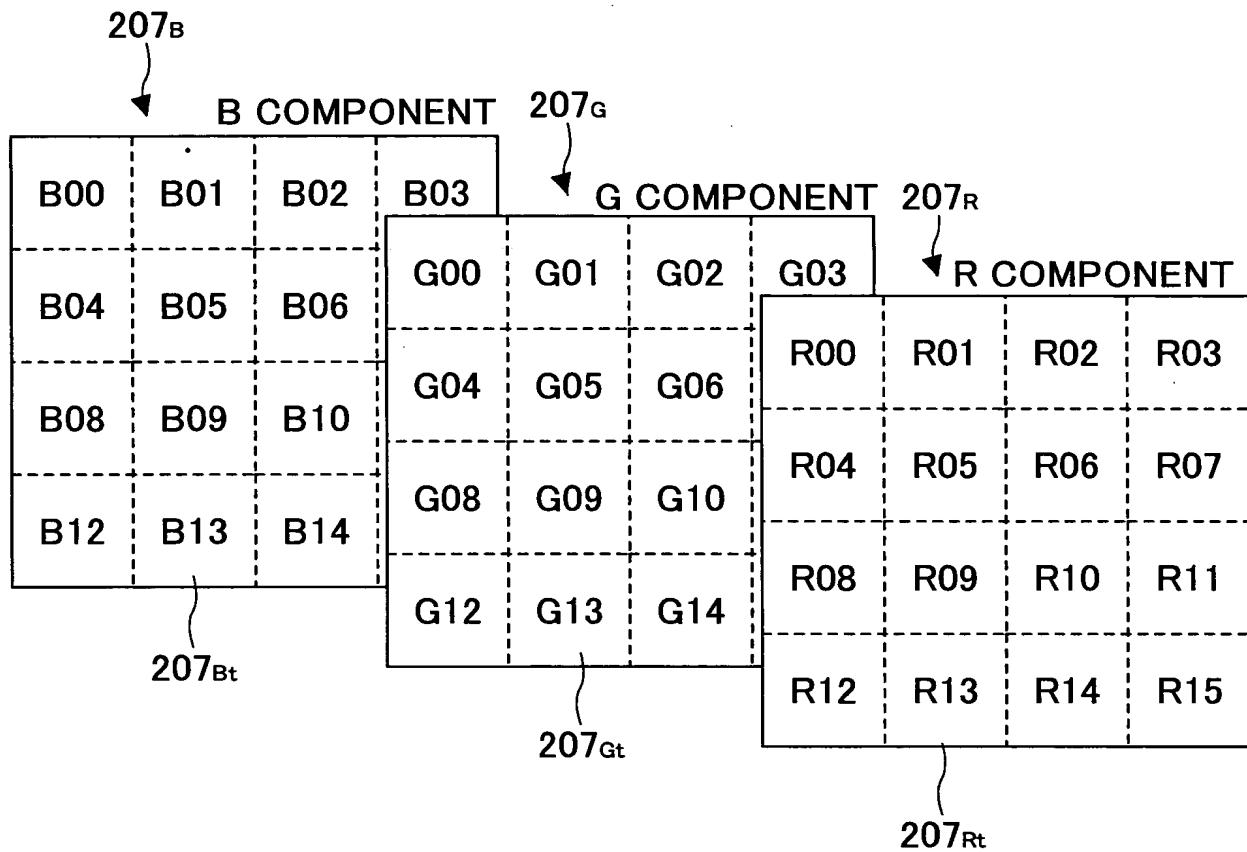


FIG.34

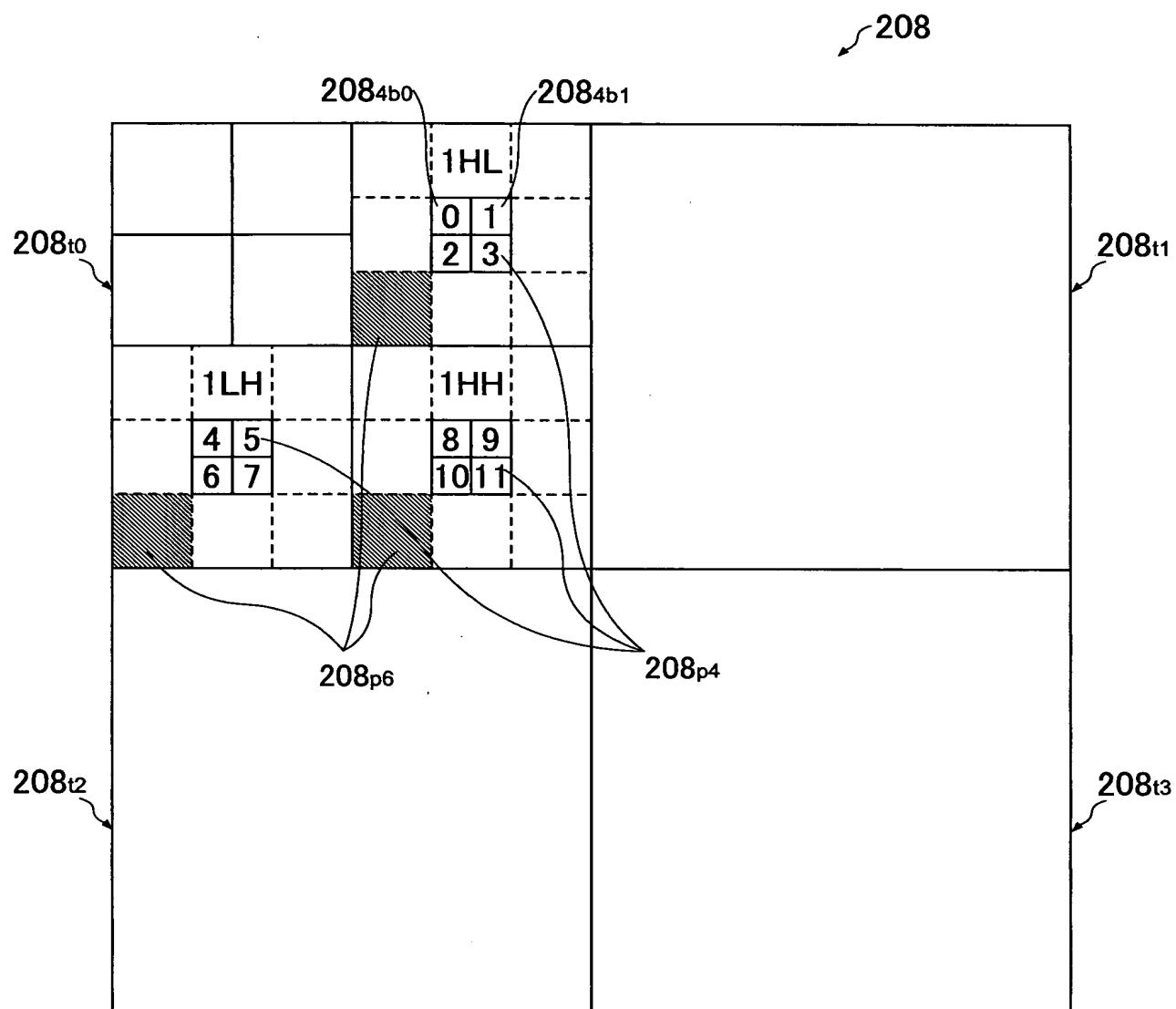


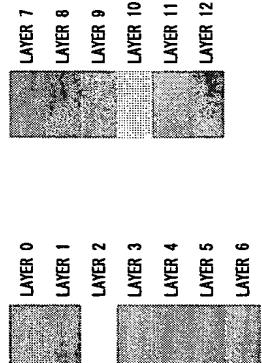
FIG. 35

FIG. 36

**FIG.37**

SUB-BAND	PRECINCT No.	BIT PLANE	SUB-BIT PLANE	PACKET								1LH								1HH																																		
				2LL	2HL	2LH	2HH	1LH				1HH				1LH				1HH				1LH				1HH																										
0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8							
12-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
11-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
10-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
9-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
8-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
7-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
6-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
5-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
4-TH BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
3-RD BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
2-ND BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
1-ST BIT CODE	REFINEMENT	CLEANUP	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51

LSB



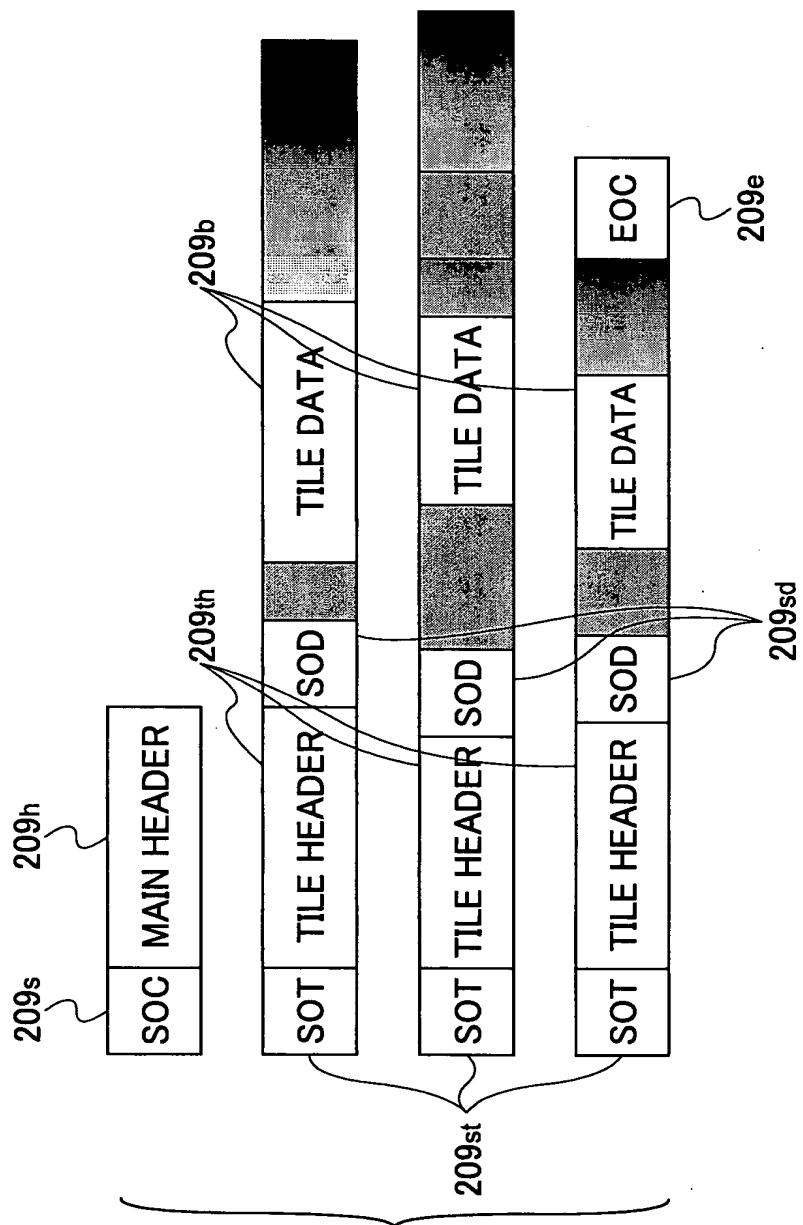


FIG.38

FIG.39

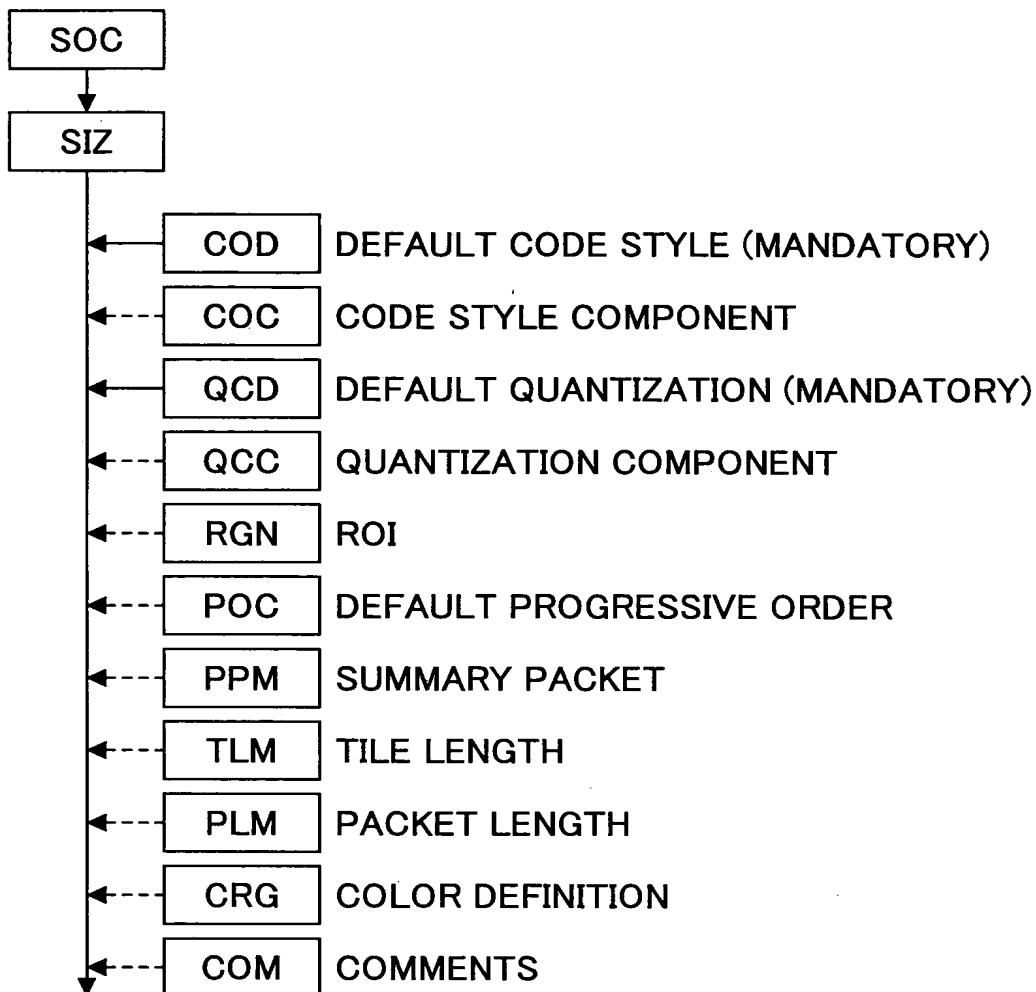


FIG.40

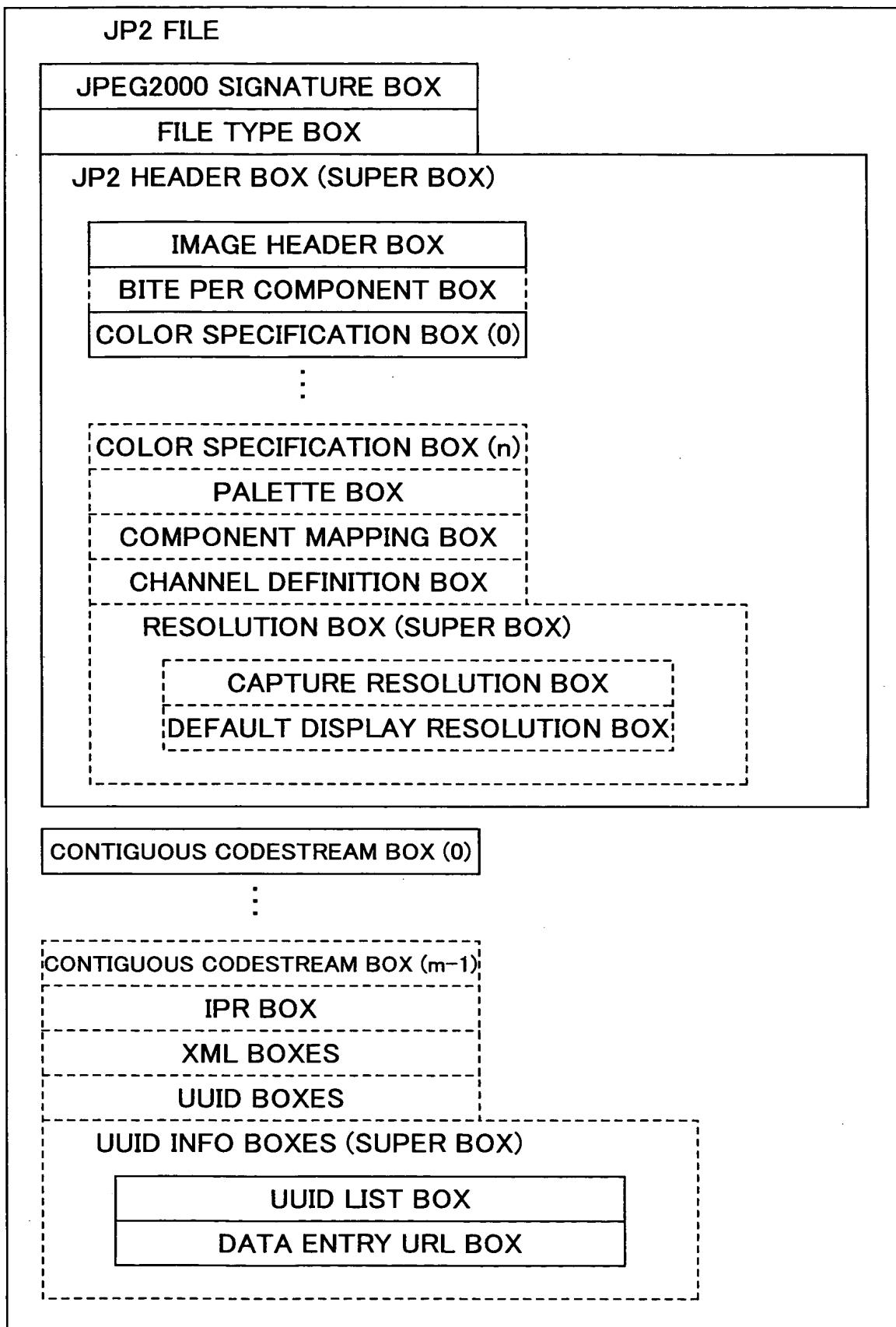


FIG.41

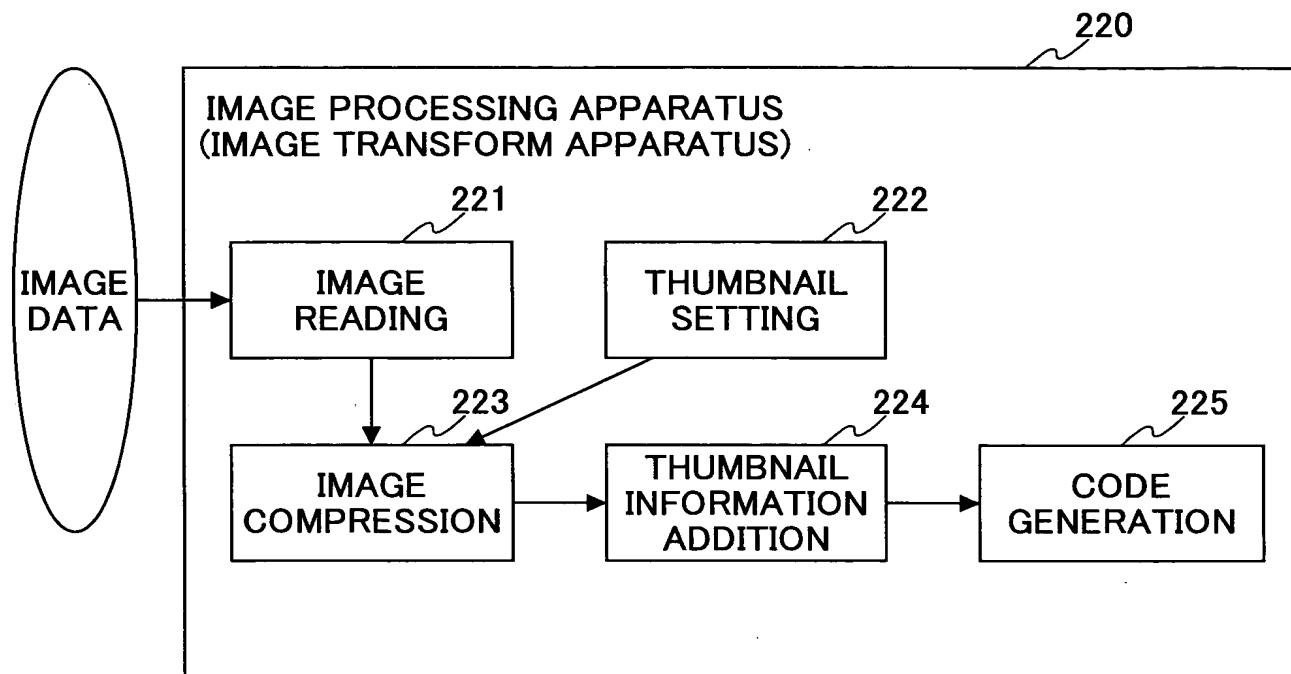


FIG.42

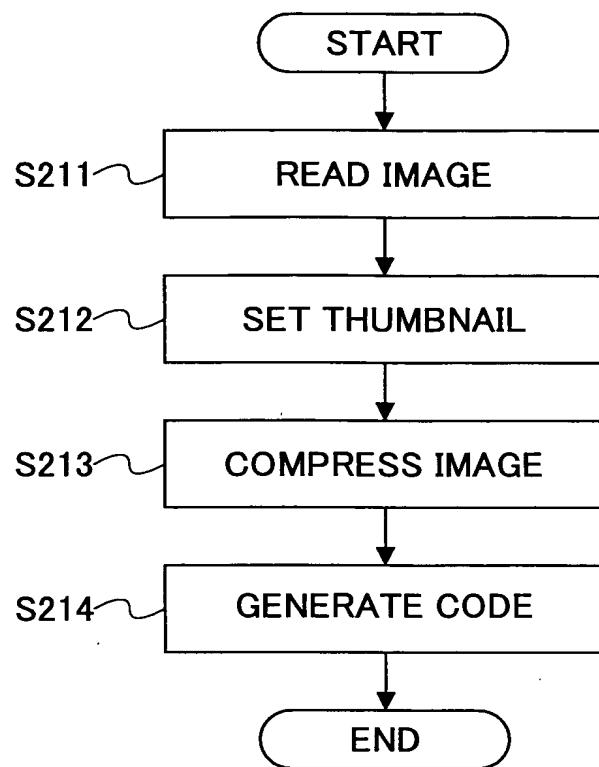


FIG.43

DISPLAY DEVICE (bps)	THUMBNAIL
DIGITAL CAMERA	CENTER TILE LAYER 3
IMAGE VIEWER SOFTWARE	DECOMPOSITION LEVEL 3 LAYER 5
CELLULAR PHONE	DECOMPOSITION LEVEL 5
DIGITAL VIDEO CAMERA	FRAME NUMBER: $2N+1$ DECOMPOSITION LEVEL 3
TV BROADCAST	ALL FRAMES TILES 6, 7, 10, 11 DECOMPOSITION LEVEL 3
HIGH-VISION BROADCAST	ALL FRAMES DECOMPOSITION LEVEL 3

FIG.44



FIG.45A



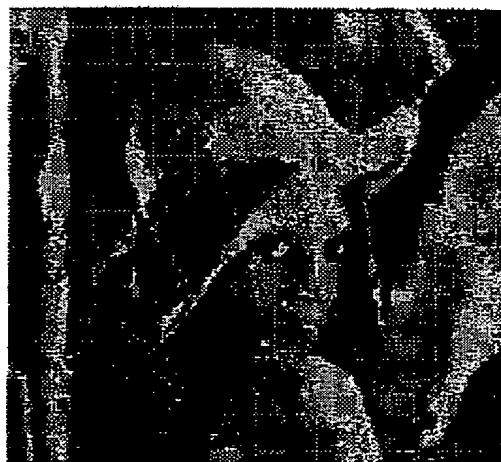
241

FIG.45B



242

FIG.45C



243

FIG.45D



244

FIG.46

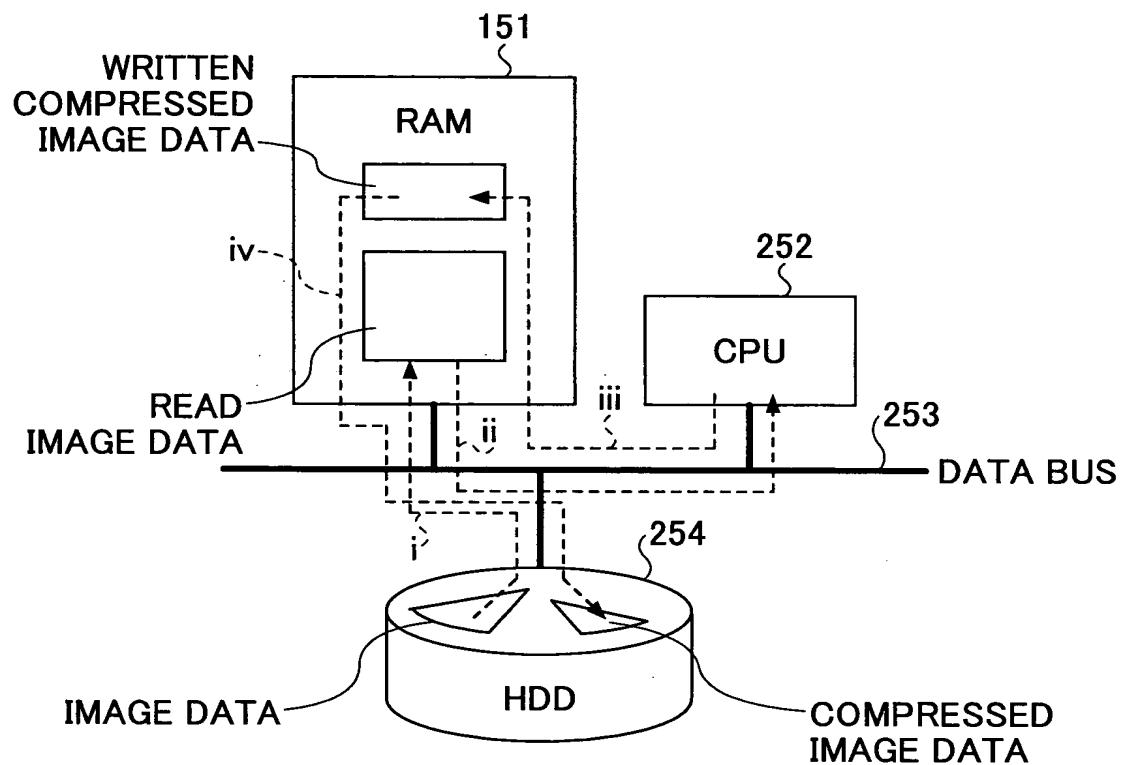


FIG.47

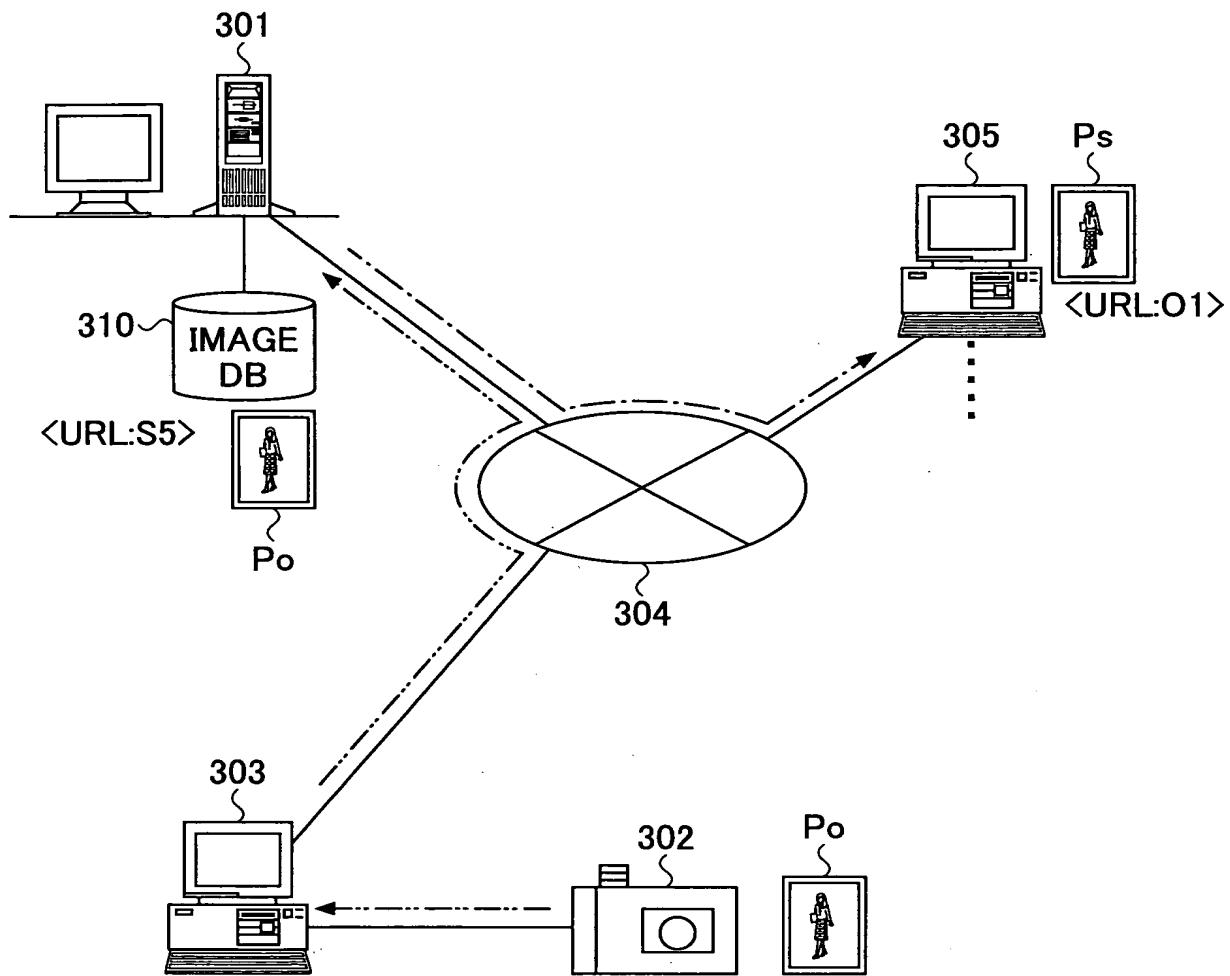


FIG.48

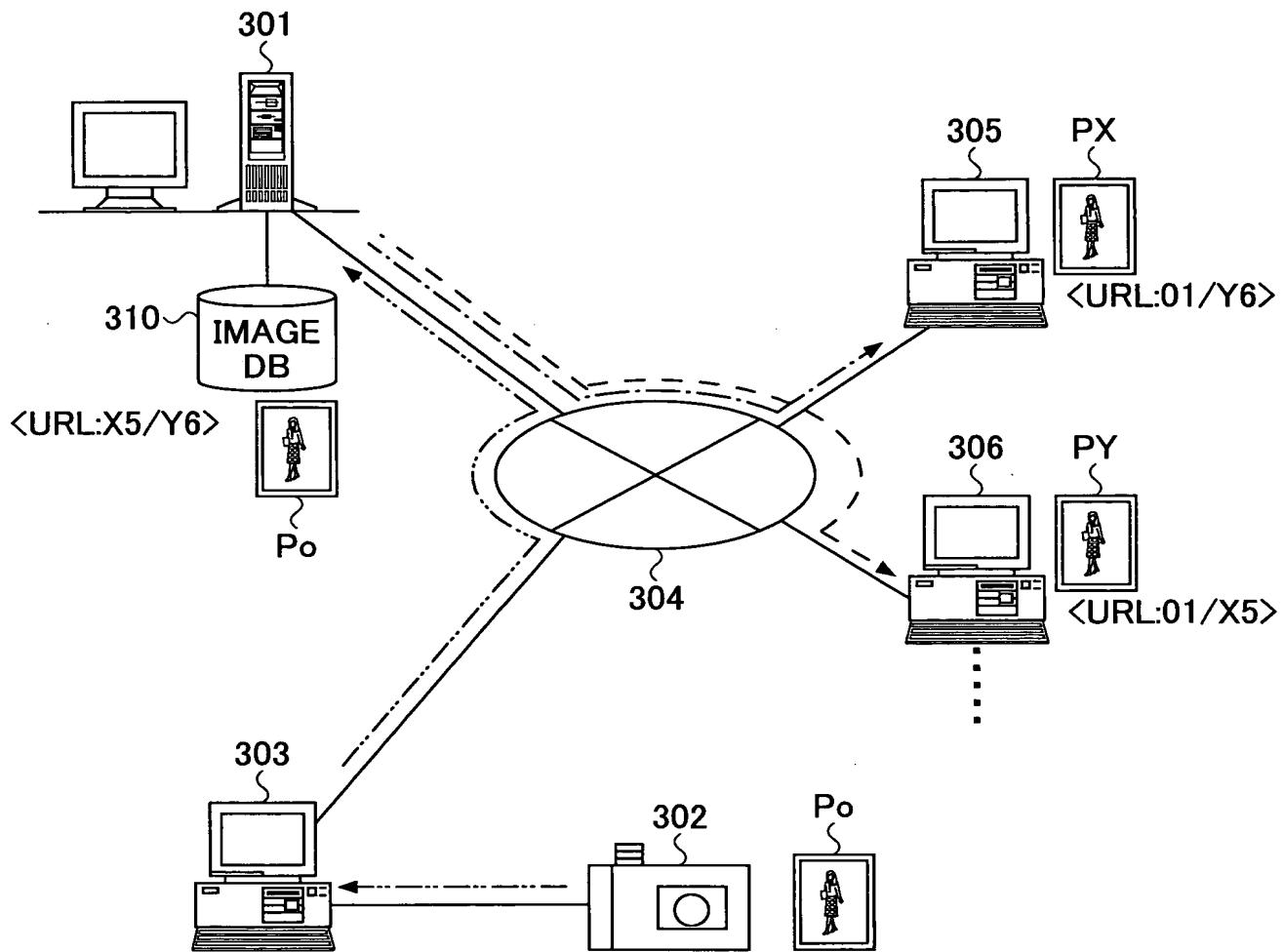
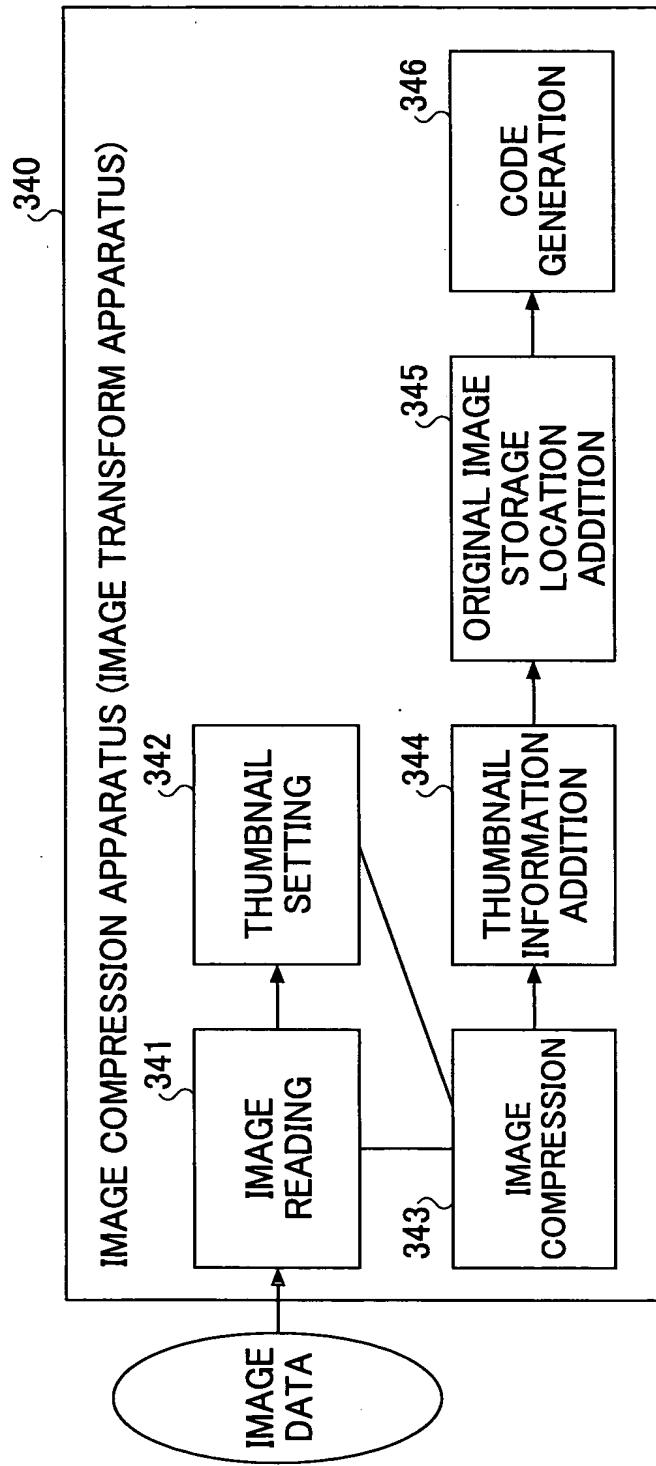


FIG.49



**FIG.50**

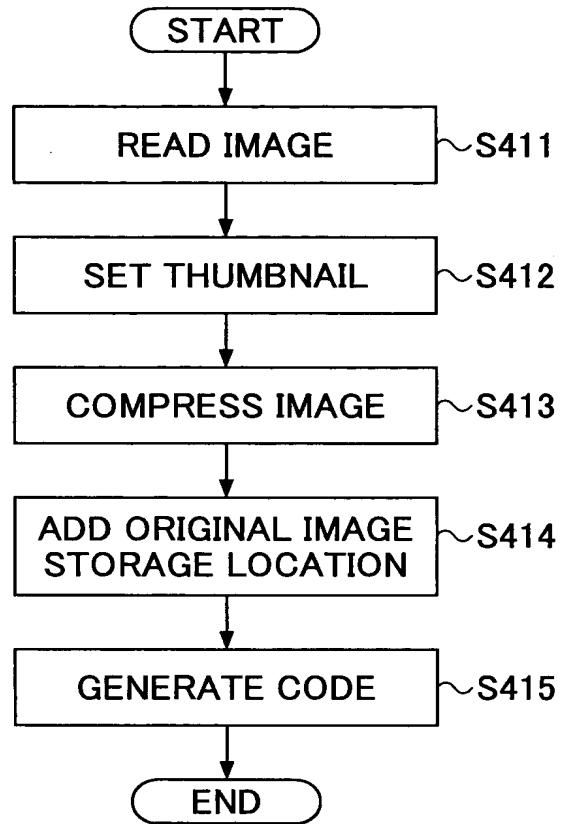


FIG.51A

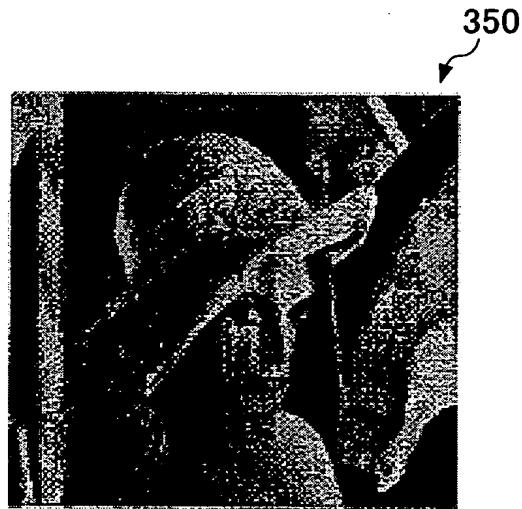
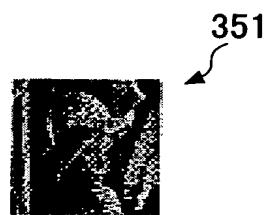


FIG.51B



# FIG.52

## TAG DESCRIPTION LEVEL (2) - 0th IFD Exit Private Tag -

TAG NAME	Field Name	TAG NUMBER		NON-COMPRESSION			COMPRESSION
		Dec	Hex	POINT ORDER	PLANE ORDER	YCC	
EXPOSURE TIME	ExposureTime	33434	829A	△	△	△	△
F NUMBER	FNumber	33437	829D	△	△	△	△
EXPOSURE PROGRAM	ExposureProgram	344850	8822	△	△	△	△
SPECTRAL SENSITIVITY	SpectralSensitivity	344852	8824	△	△	△	△
ISO SPEED RATE	ISOSpeedRatings	344855	8827	△	△	△	△
PHOTOELECTRIC CONVERSION FUNCTION	OECF	344856	8828	△	△	△	△
EXIF VERSION	Exif Version	36864	9000	◎	◎	◎	◎
ORIGINAL IMAGE DATA CREATED DATE	DateTimeOriginal	36867	9003	△	△	△	△
DIGITAL DATA CREATED DATE	DateTimeDigitized	36868	9004	△	△	△	△
MEANING OF EACH COMPONENT	ComponentsConfiguration	37121	9101	×	×	×	◎
IMAGE COMPRESSION MODE	CompressedBitsPerPixel	37122	9102	×	×	×	△
SHUTTER SPEED	ShutterSpeedValue	37377	9201	△	△	△	△
APERTURE VALUE	ApertureValue	37378	9202	△	△	△	△
BRIGHTNESS VALUE	BrightnessValue	37379	9203	△	△	△	△
EXPOSURE CORRECTION VALUE	ExposureBiasValue	37380	9204	△	△	△	△
LENS MINIMUM F NUMBER	MaxApertureValue	37381	9205	△	△	△	△
SUBJECT DISTANCE	SubjectDistance	37382	9206	△	△	△	△
PHOTOMETRIC METHOD	MeteringMode	37383	9207	△	△	△	△
LIGHT SOURCE	LightSource	37384	9208	△	△	△	△
FLASH	Flash	37385	9209	△	△	△	△
LENS FOCAL LENGTH	FocalLength	37386	920A	△	△	△	△
MANUFACTURER'S NOTES	MakerNote	37500	927C	△	△	△	△
USER'S COMMENTS	UserComment	37510	9286	△	△	△	△
SUB SEC OF DATE TIME	SubSecTime	37520	9290	△	△	△	△
SUB SEC OF DATE TIME ORIGINAL	SubSecTimeOriginal	37521	9291	△	△	△	△
SUB SEC OF DATE TIME DIGITIZED	SubSecTimeDigitized	37522	9292	△	△	△	△
FLASH PIX VERSION	FlashPixVersion	40960	A000	◎	◎	◎	◎
COLOR SPACE INFORMATION	ColorSpace	40961	A001	◎	◎	◎	◎
EFFECTIVE IMAGE WIDTH	PixelXDimension	40962	A002	×	×	×	◎
EFFECTIVE IMAGE HEIGHT	PixelYDimension	40963	A003	×	×	×	◎
RELATED SOUND FILE	RelatedSoundFile	40964	A004	△	△	△	△
POINTER FOR INTEROPERABILITY IFD	Interoperability IFD Pointer	40965	A005	×	×	×	△
FLASH ENERGY	FlashEnergy	41483	A20B	△	△	△	△
SPATIAL FREQUENCY RESPONSE	SpatialFrequencyResponse	41484	A20C	△	△	△	△
FOCAL PLANE WIDTH RESOLUTION	FocalPlaneXResolution	41486	A20E	△	△	△	△
FOCAL PLANE HEIGHT RESOLUTION	FocalPlaneYResolution	41487	A20F	△	△	△	△
FOCAL PLANE RESOLUTION UNIT	FocalPlaneResolutionUnit	41488	A210	△	△	△	△
SUBJECT LOCATION	SubjectLocation	41492	A214	△	△	△	△
EXPOSURE INDEX	ExposureIndex	41493	A215	△	△	△	△
SENSOR METHOD	SensingMethod	41495	A217	△	△	△	△
FILE SOURCE	FileSource	41728	A300	△	△	△	△
SCENE TYPE	SceneType	41729	A301	△	△	△	△
CFA PATTERN	CFAPattern	41730	A302	△	△	△	△

MEANING OF SYMBOL:

- ◎ MANDATORY (WHICH SHOULD BE DESCRIBED)
- SEMI-MANDATORY(WHICH SHOULD BE DESCRIBED UNLESS LIMITATION DUE TO HARDWARE OR SO)
- △ OPTIONAL(DESCRIBED AS NEEDED ACCORDING TO PARTICULAR DEVICE)
- ✗ NOT BE DESCRIBED
- ✗ NOT BE DESCRIBED SINCE DESCRIBED IN JPEG MARKER

FIG.53

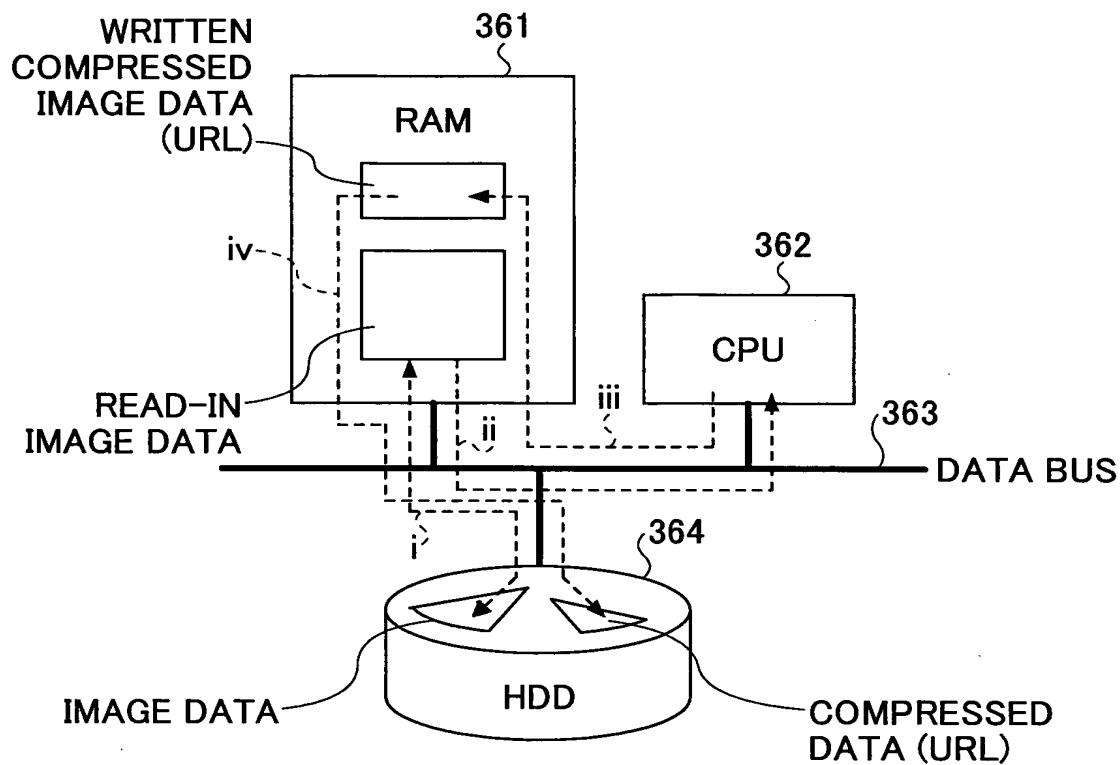


FIG.54

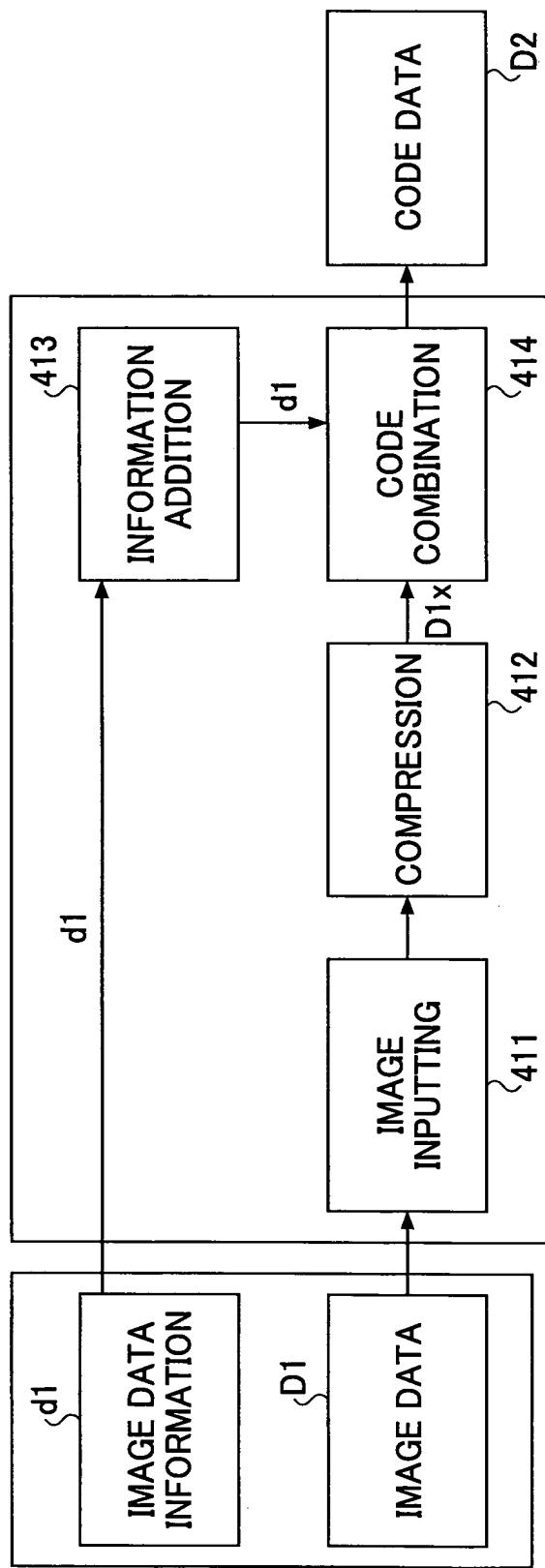


FIG.55

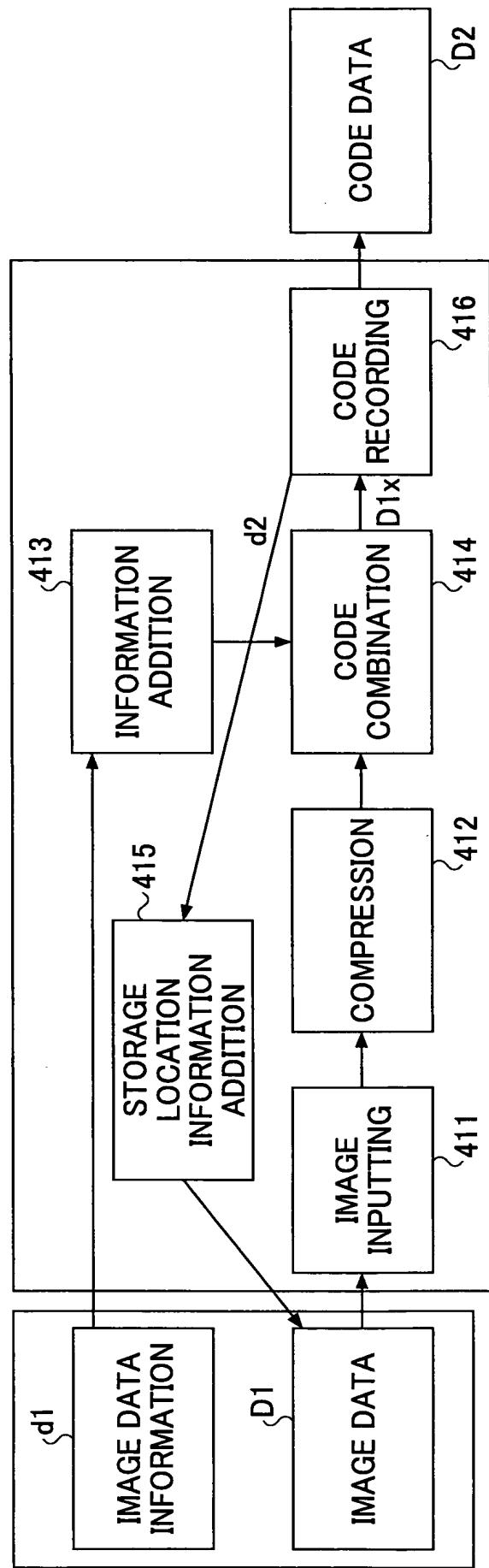


FIG.56

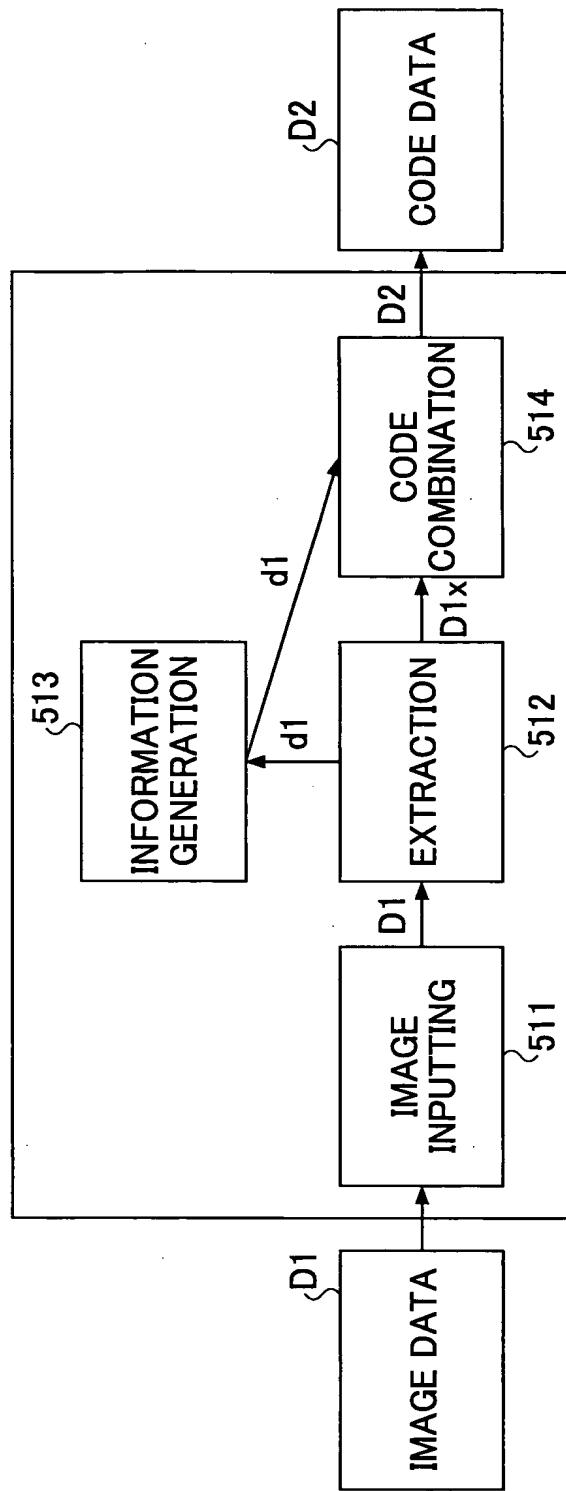


FIG. 57

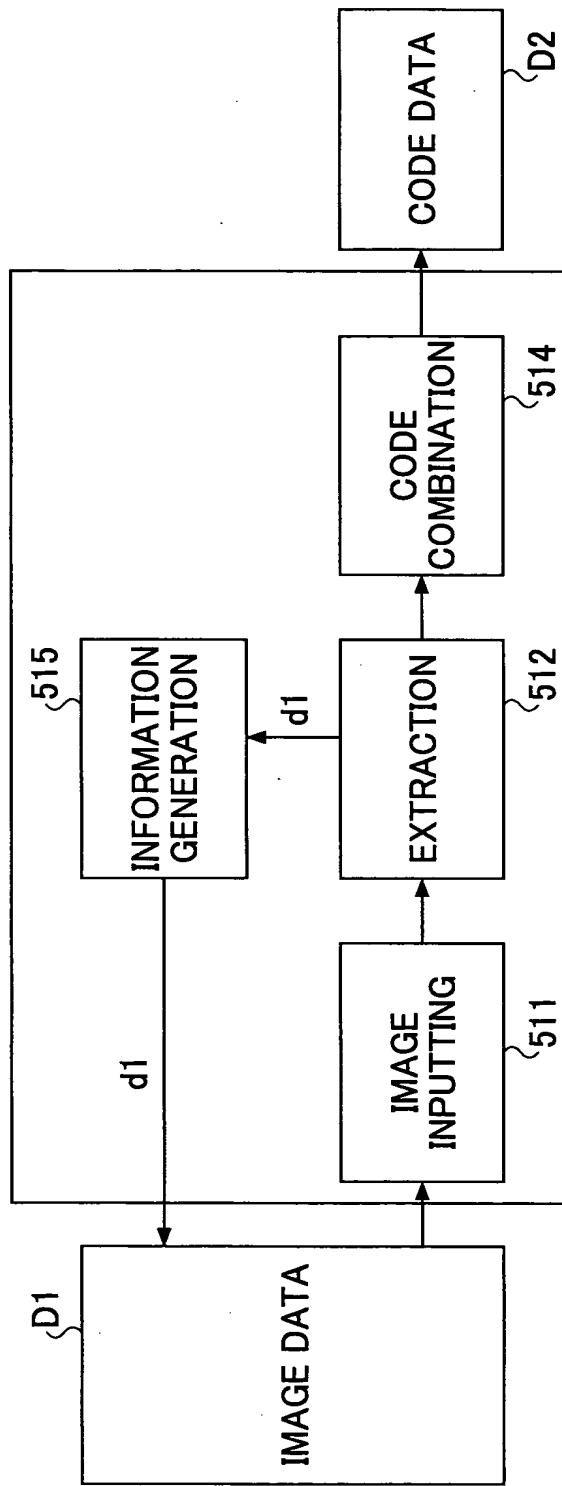


FIG. 58

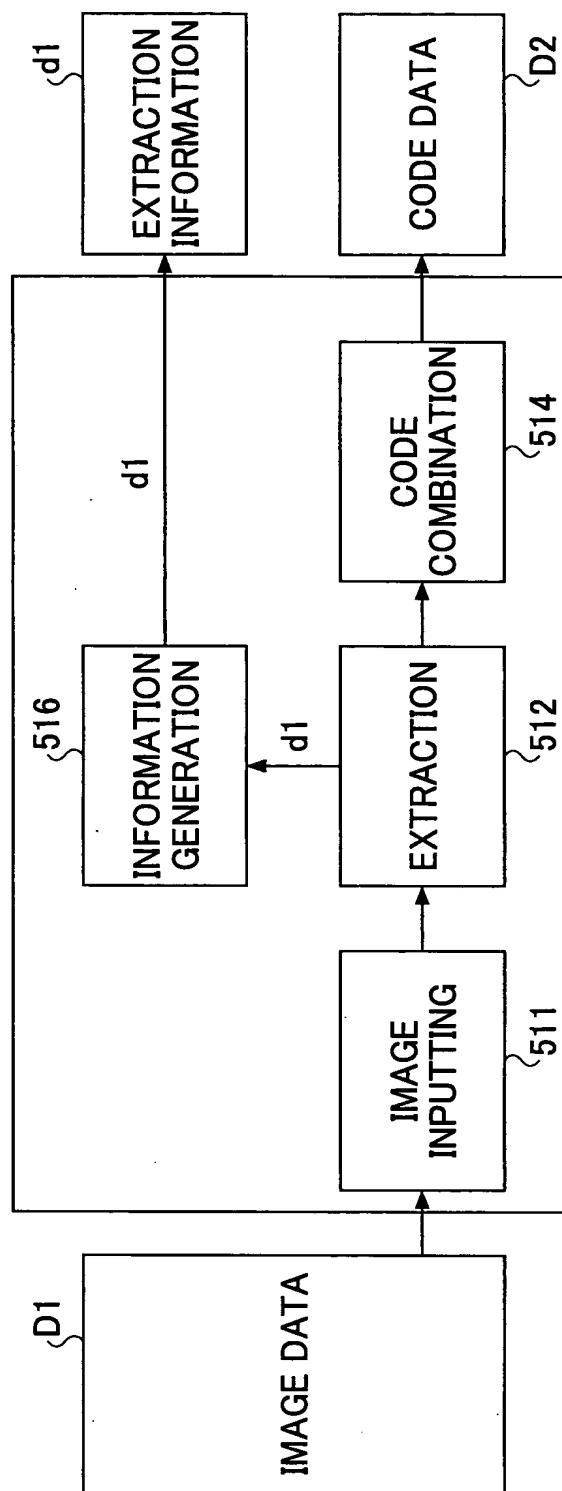


FIG.59

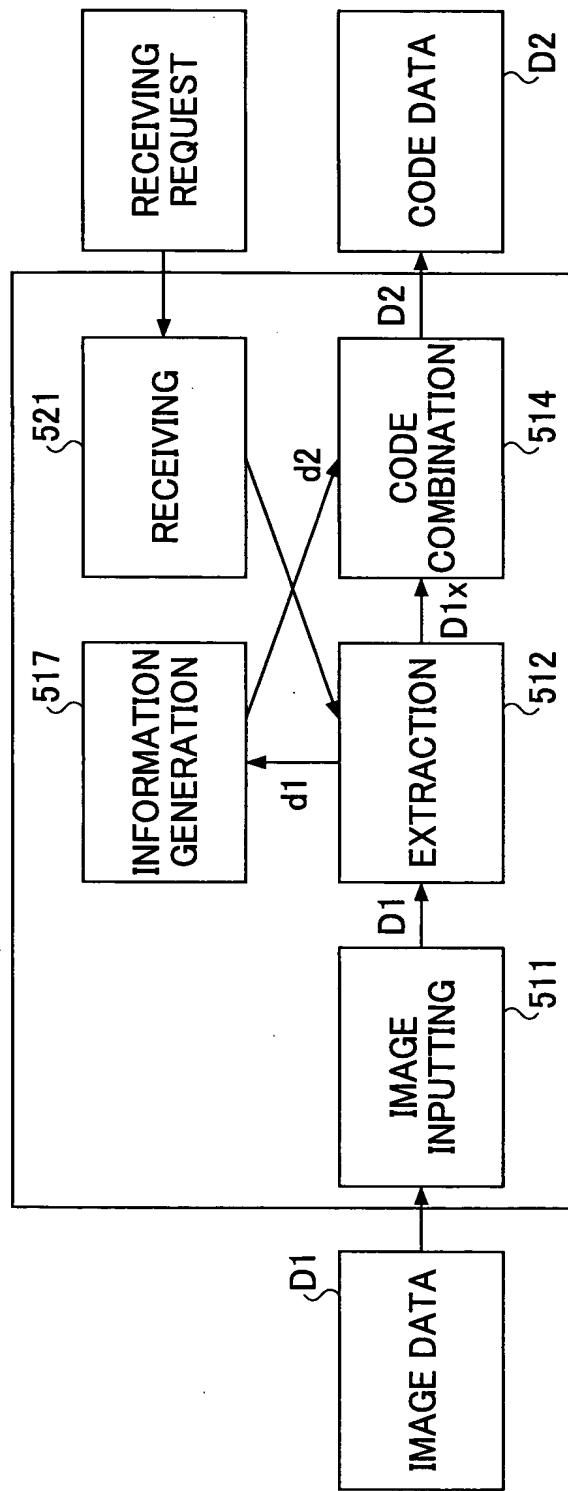


FIG. 60

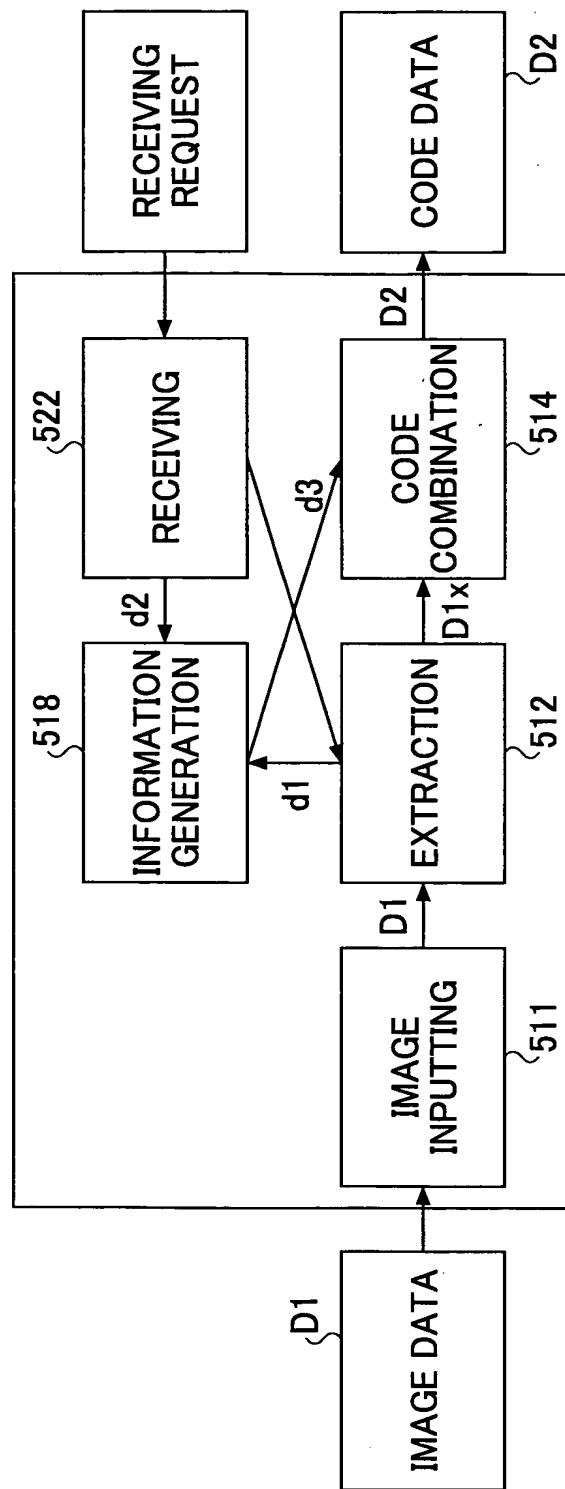


FIG.61

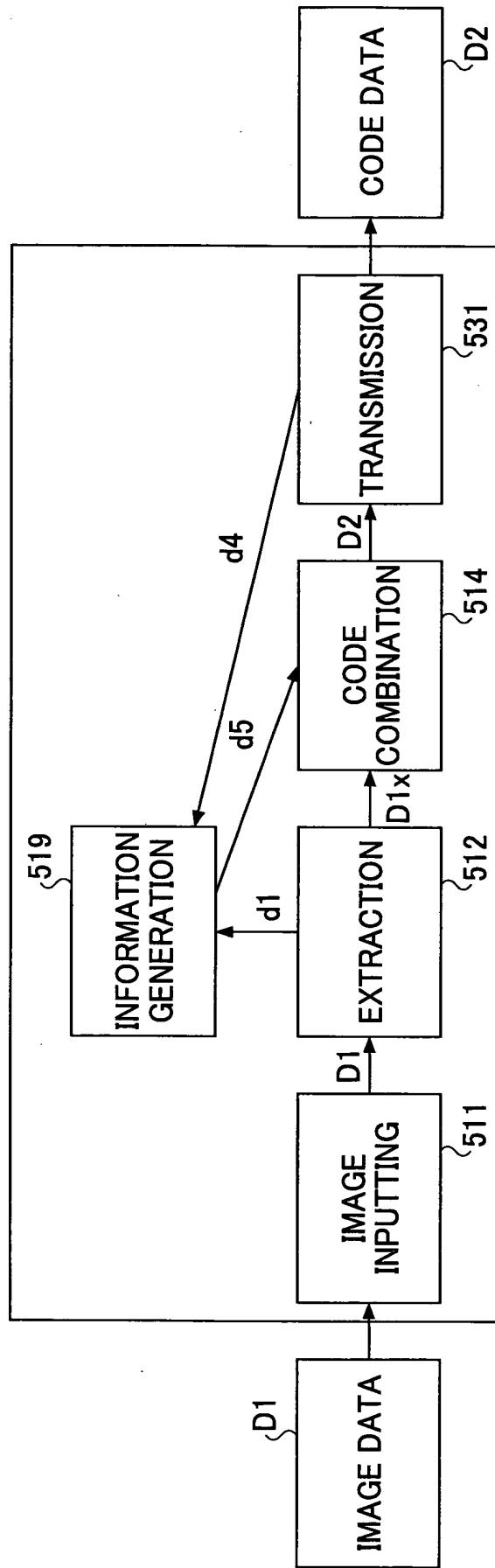


FIG.62

EMBEDDING INFORMATION	
IMAGE ATTRIBUT	SIZE
EMBED ORIGINAL IMAGE INFORMATION TO EXTRACTED IMAGE	CRATED DATE/TIME
EMBED EXTRACTED IMAGE INFORMATION TO ORIGINAL IMAGE	UPDATED DATE/TIME
	COMMENTS
	ACCESS DATE/TIME
	POSSESSOR
	CREATOR
	TITLE
	SUBJECT
	CATEGORY
	NUMBER OF PAGES
	COPYRIGHT
	COMPANY NAME
	APPLIED SOFTWARE
	COMPRESSION METHOD
	JPEG, J2K, GIF, ...
COMPRESSION CONDITION:	IMAGE SIZE, POSITION OFFSET
	TILE SIZE, OFFSET
	PRECINCT SIZE
	CODE BLOCK SIZE
	PROGRESSION ORDER
	NUMBER OF LAYERS
	COLOR TRANSFORM
	NUMBER OF LEVELS
	QUANTIZATION PARAMETER
SENDER, RECEIVER	NAME
SERVER, CLIENT	PC NAME
	URL, IP ADDRESS
	TRANSFER METHOD
	TCP/IP, HTTP, FTP
	DATE/TIME
EXTRACTION CONDI TON	TILE NUMBER
	PACKET NUMBER
	EXTRACTING PACKET COMPONENT
	RESOLUTION
	COLOR COMPONENT
	PRECINCT
	LAYER
	EXTRACTION TIME